RIGOL

User's Guide

UltraUV Spectrum Work Station

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RIGOL Technologies, Inc

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Welcome to UltraUV

UltraUV is a PC application software developed by **RIGOL** for the **Ultra-6000** series and Ultra-3000 series UV-VIS spectrophotometer. This software is design on the basis of the commonly used standard drive **VISA** and you can build the communication between the software and the instrument via the **USB**, **RS232** or **LAN** interface to control the instrument. **UltraUV** provides easy operation and powerful functions (including data acquisition, analysis and report).

UltraUV mainly consists of five parts:

- Spectrum Module
- Kinetics Module
- Photometric Module
- Quantitation Module
- Report Generator

Other Features:

- Easy operation mode and clear interface layout
- Real-time display of the current wavelength and absorbance and timely control of the instrument
- Diagrams for displaying, acquiring and controlling the data
- Abundant post-processing programs, such as point pick detect, peak pick detect and area detect
- Various operation functions
- Normalization, user management and operation log

Document Overview

This manual introduces how to make measurements using the **UltraUV** spectrum work station with the **Ultra-6000** series and Ultra-3000 series UV-VIS spectrophotometer. You are recommended to read the **Ultra-6000 Series UV-VIS Spectrophotometer User's Guide**/**Ultra-3000 Series UV-VIS Spectrophotometer User's Guide** and this manual to get a complete understanding as far as possible of the functions as well as the operation methods of the instrument and the software before using the software.

Main Topics:

Document Conventions:

Blue	represent a specified platform and the introductions following are only applicable to this platform.
Black	represent those items (such as the menu items and the dialog box items) in the software that must be selected or clicked; represent the parameter names, input control modules and display control modules at the front panel, dialog box as well the names of some dialog boxes and menus.
Aquamarine	represent parameters that can be set or selected.
Orange	represent a link.
	inform users to adopt precautions to avoid data loss or system crash; inform users to pay attention to the notices during the use of the software.
	inform users to pay attention to important information.
Tab	represent the buttons on the keyboard.

Contents

Chapter 1 Software Installation and Configuration

This part mainly introduces the running environment of **UltraUV** as well as how to install the software and set the external parameters of the software using the configuration program.

Main Topics:

1.1 Configuration Requirements

UltraUV can be used under Microsoft Windows XP/ Windows Vista/ Windows 7 Chinese and English operation system. Make sure your PC fulfills the following requirements before installing the software.

- A free COM, USB or LAN interface (for connecting the **Ultra-6000** series instrument).
- A CD ROM or DVD-ROM drive (for installing **UltraUV**).

Recommended configurations: Pentium1.4GHz CPU, 256MB memory, 32MB graphics acceleration graphics card, 17 inches color display, CD-ROM or DVD-ROM. Wherein, the graphics acceleration graphics card is mainly used to make 3D acceleration for the 3D chromatograms. Therefore, you can just install a normal graphics card if your requirement of 3D chromatogram is not high.

Besides, at least 20MB hard disk space is required for **UltraUV**. Therefore, make sure that there is enough space for the software on your hard disk.

1.2 To Install the Software

Installation of **UltraUV** requires more than 800MHz CPU, more than 64MB memory and 50MB to 200MB hard disk space depending on the number of components to be installed.

Installation Procedures:

- Insert the CD into the drive.
- At this point, the system runs the installation guide program automatically (if not, select the **Setup.exe** file in the CD and run it manually).
- Follow the software wizard to install the software.
- A start-up icon  will be created in the PC start-up item, program directory and on the desktop after the installation succeeds.

Note:

- Make sure that you have the system administrator permission as well as the write and read permissions of the work station files before installing the software.
- You need to install the **VISA** resource library when installing the software; otherwise, the communication between **UltraUV** and the instrument can not be built. As the **VISA** resource library would not be installed automatically when installing the software, you need to install the **NI-VISA** manually and **NI-VISA 4.6.2** version or higher is recommended. If your PC is already installed with the **VISA** resource library, ignore this information.

Tip:

- Security warnings might be displayed during the installation. To install the software successfully, unblock the installation or add the software to the trust list of the **Windows** firewall.
- This software provides two application modes (Normal and GLP). When GLP is selected, user name and password are required for logging in to the system to limit the visit of the system.

1.3 To Update the Software

RIGOL will update the software on regular or irregular basis. To ensure the optimum performance of the software, please update your software timely.

Tip:

- Uninstall the software installed before installing the new version to ensure correct installation as update of the software via direct overwrite might introduce in unnecessary error.

1.4 To Uninstall the Software

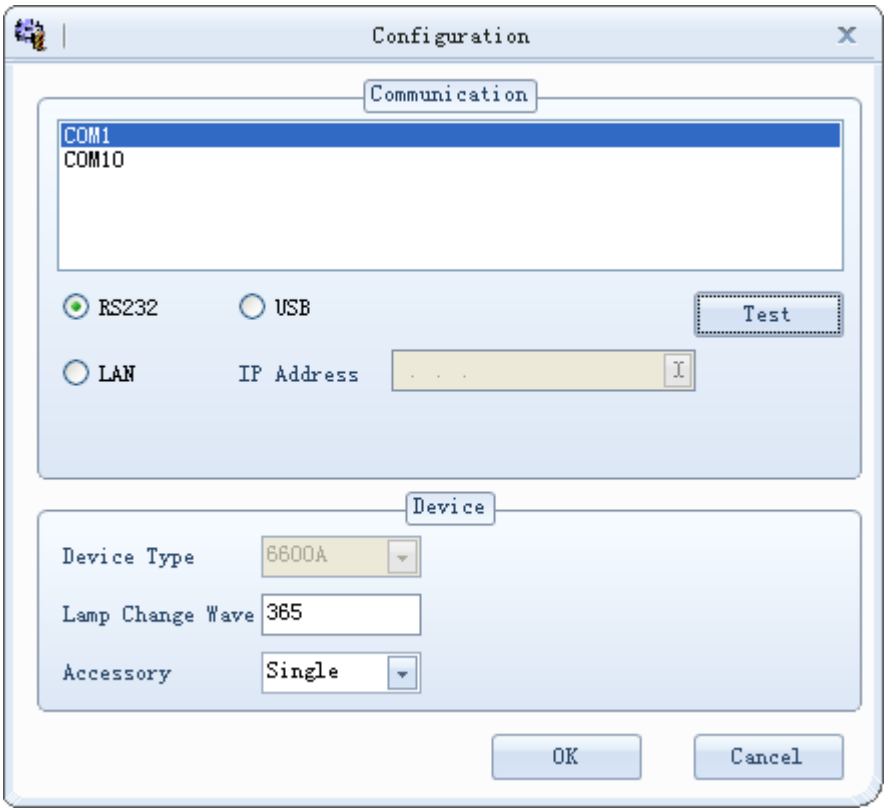
If you need to remove **UltraUV** from your PC, run the "Uninstall" program in the program folder and the system will uninstall **UltraUV** from your PC automatically.

Tip:

- You can also remove the software by **Windows→Start→Control Panel,** select **UltraUV** in the program list and click **Change/Delete.**
- All the sample data will be deleted when you delete **UltraUV**. Therefore, make a copy of the desired file data. Those files created and stored in the hard disk will not be deleted.
- By default, the measurement data file is stored in the **Data** folder under the directory of the installation file. Besides, you can find the corresponding folder via the shortcut of **UltraUV** on the desktop.

1.5 To Configure the Instrument

After the software is installed, double-click the run program and the configuration dialog box (as shown in the figure below) will be displayed automatically after the system starts up. This dialog will be displayed each time you run **UltraUV** and click **Cancel** if configuration is not necessary.



Tip:

- In GLP mode, the user login dialog box is displayed when you double-click the run program. If a new account is created, select the desired user name, input the correct password and click **OK** to log in.

Communication

Set the communication port to be used. **UltraUV** can communicate with the instrument via **RS232**, **USB** and **LAN**. After the software is connected with the instrument, the ports available (such as **COM1**) will be displayed in the communication list. If the **VISA** library is not installed, the communication list would be blank and the communication between the software and the instrument can not be built.

Test

Test whether the communication between the instrument and the software is normal. The instrument must be connected to the PC before testing the communication. The operation method is as follows.

- Connect the PC and **Ultra-6000** using the serial cable (RS232).
- Power on the instrument and turn on the instrument power switch.
- At this point, the ports available (such as **COM1**) are displayed in the communication list.
- Click **Test** and the system will test the communication between the software and the instrument automatically. After the test is finished, the communication dialog box is displayed to inform you the communication state. If the communication succeeds, click **OK** or close the dialog box; if "**Communication Test Error**" is displayed, refer to **Troubleshooting** to solve the problem.

Device

Set the instrument-related parameters.

Device Type

View the model of the instrument. By default, it is 6600A and can not be set.

Lamp Change Wave (nm)

Set the interchange wavelength of the deuterium lamp and tungsten lamp and the range is from 320nm to 380nm.

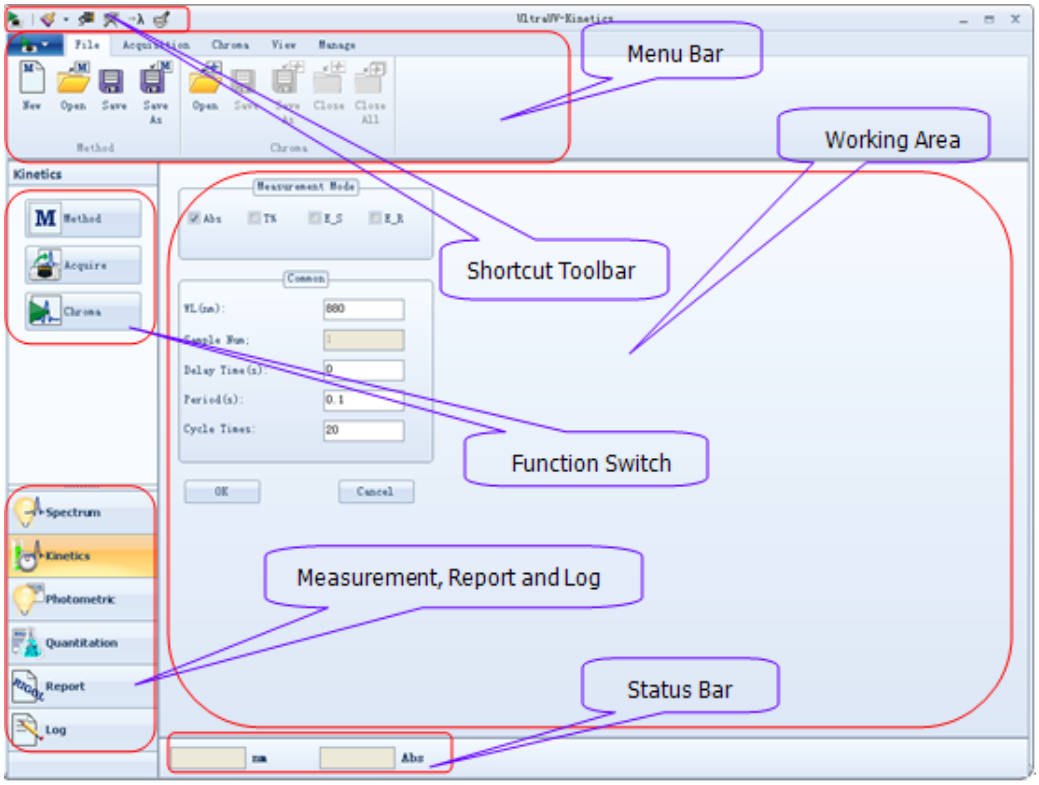
Accessory

The accessories available include single cell, integrating sphere and 8-series multicell.

Click **OK** to save the setting and exit the configuration dialog box after setting the corresponding parameters and the communication test becomes normal. Click **Cancel** or directly close the configuration dialog box to give up the current setting.

1.6 Basic Software Interface

Click the **UltraUV** start-up icon  to start up the work station. Note: the **Configuration** window will be displayed each time you start the work station, please refer to the corresponding introduction to configure the parameters and then click **OK** to enter the main interface of the work station as shown in the figure below.



Shortcut Toolbar

Provide shortcuts for the commonly used operations (include software interface style, connecting/disconnecting the instrument, setting the specified wavelength (the range is from 190nm to 900nm) and self-check) of the work station.

Menu Bar

Display the operation menus (include **File**, **Acquisition**, **Chroma**, **View** and **Manage**) of the work station. Each menu contains multiple sub-menus. The working area displays different content when different menu is selected. Note: there are not the **Chroma** and **View** menus in **photometric** and **quantitation** measurements.

Function Switch

Used to switch among the **Method**, **Acquisition** and **Chroma/Data** functions of the work station.

Working Area

Used to set the measurement mode, acquisition and chromatogram information.

Measurement, Report and Log

Used to select the type of measurement of the work station, generate measurement report and view measurement log.

Status Bar

Display the current wavelength and absorbance.

Chapter 2 System Management

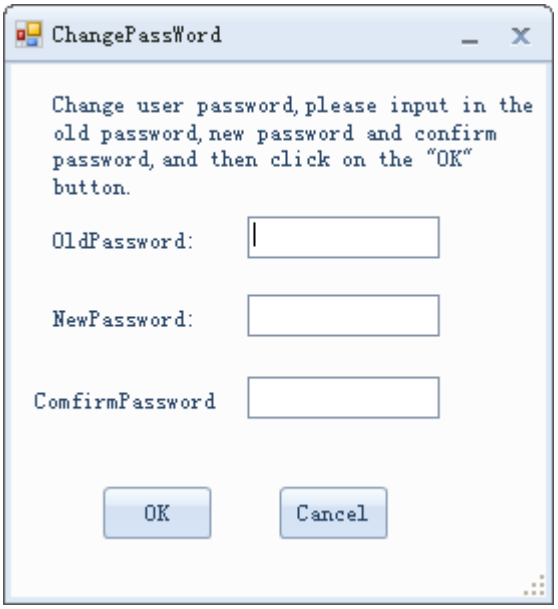
Two application modes (Normal and GLP) are provided when installing **UltraUV**. When GLP is selected (the default user name and the password are "Admin" and "123" respectively when you log in to the system for the first time), you can set the system through the options under the **Manage** menu in the **menu bar**.

This section introduces the basic system management. When **UltraUV** is installed for the first time, the system contains four specified groups (Admin, Developer, Operator and Guest). Wherein, the administrator group has all the permissions and when a user is added to this group, he can access the **UltraUV** system without any limit. Generally, in order to control the visit of the system, groups with different access levels are created and users are distributed to the corresponding groups.

 **Main Topics:**

2.1 To Change the Password

Click **ChangePassWord** under the **Manage** menu to change the login password of the user.



1. Input the current password.

2. Input the **new password**.

3. Input the new password again.

4. Click **OK**.

Tip:

- The user currently logged in can change the password only when he has the permission to change password.

2.2 User and Group

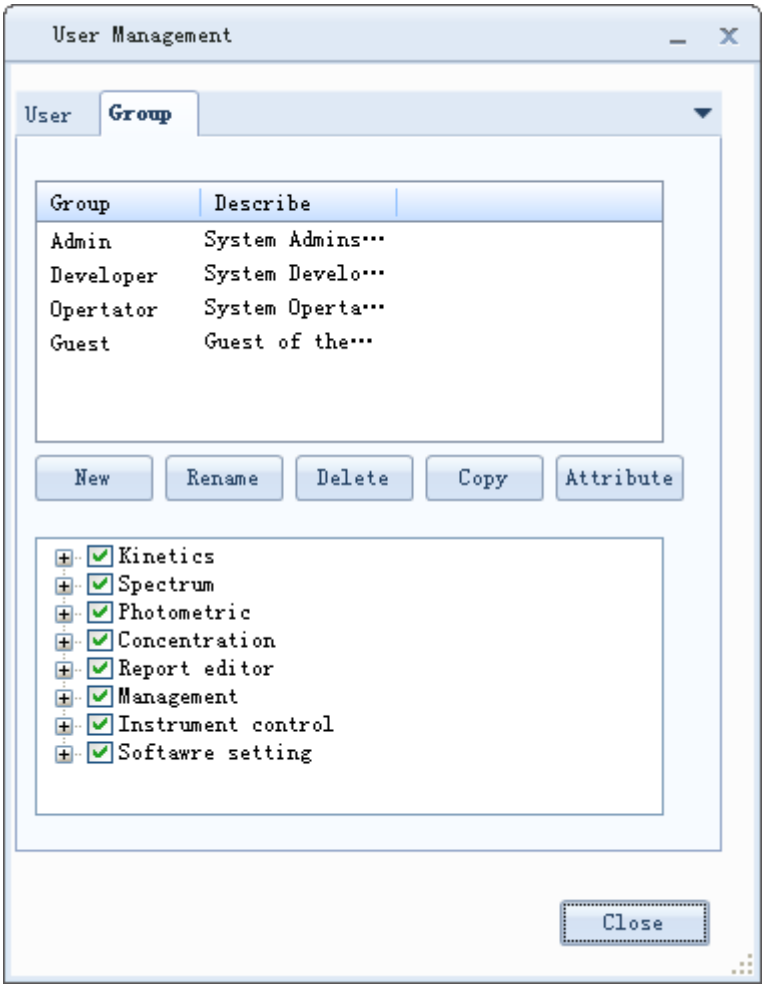
For easier management, every user should belong to a group. The system using permissions of each user can be controlled by setting the permissions. The following rules apply to the user and group.

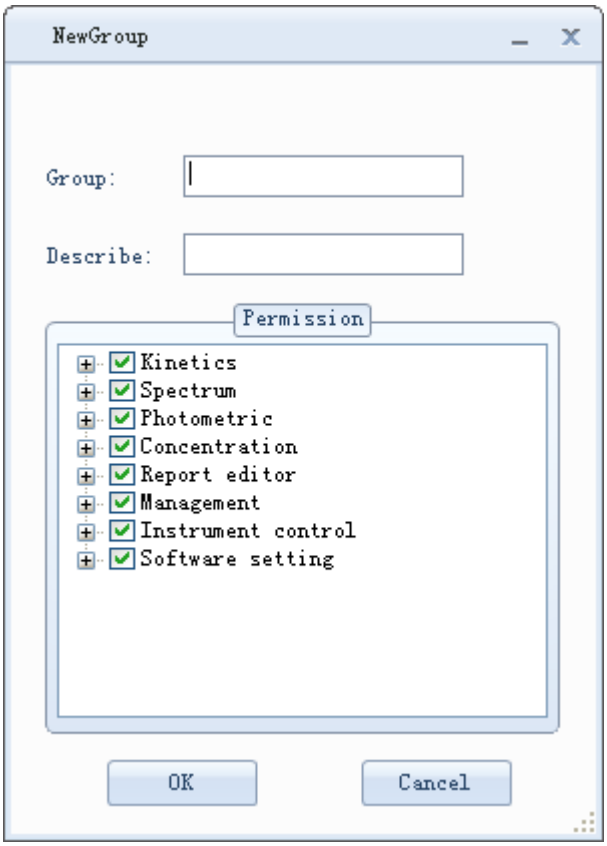
- Group is the combination of users
- Every user must belong to a group
- Group has specified permissions
- Users in the same group enjoy the same permissions

Main Topics:

2.2.1 To Create a New Group

Click **User Management** under the **Manage** menu and select the **Group** option in the pop-up dialog box.





Users can add a new group through two methods: create a new group; use the permissions of the group already exists.

Create a new group:

1. click **New** in the dialog box to open the **NewGroup** dialog box.

2. Input the name of the group and you can also add a description of the group.

3. Select the permissions of this group in the permission checkboxes.

4. Click **OK**.

Use the permissions of the group already exits:

1. select a group from the group list.

2. Click **Copy** to create a copy of that group in the group list.

3. Select the group newly created, click **Rename** and you can modify the name of this group in the pop-up dialog box.

2.2.2 To Delete a Group

1. Select the group to be deleted in the group list.

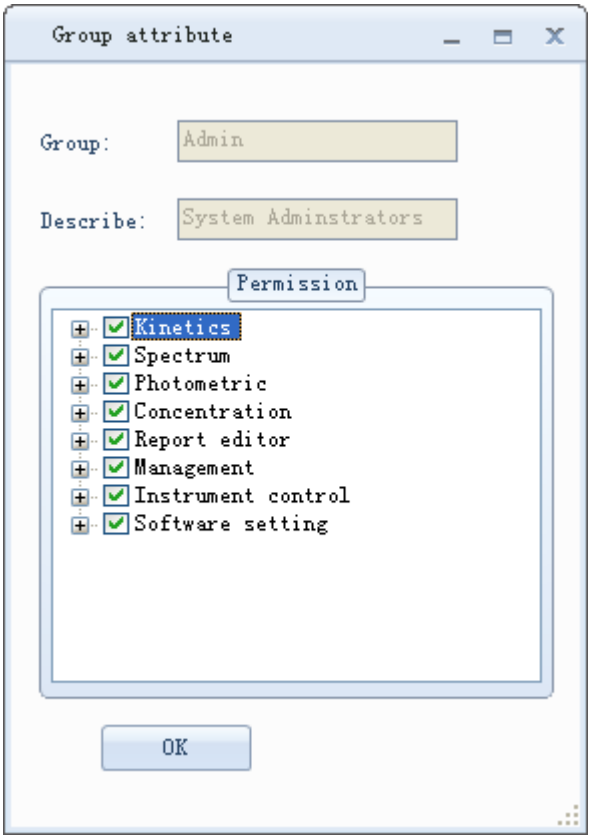
2. Click **Delete**.

Tip:

- Group that contains users can not be deleted. Otherwise, the users in the group will also be deleted.
- The group currently logged in to the system can not be deleted.
- The system group can not be deleted.

2.2.3 To Modify the Group Permissions

You can modify the group permissions through the **Attribute** option.



1. Select the desired group from the group list.

2. Click **Attribute** under the **Group** option and the **Group attribute** dialog box will be displayed.

3. Modify the permissions of this group via the permission checkboxes.

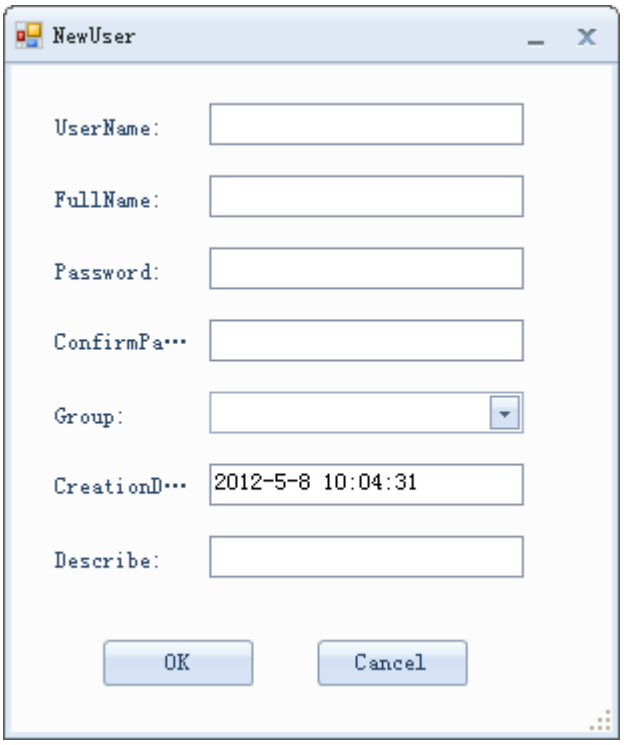
4. Click **OK**.

Tip:

- The permissions of the group of the current user can not be modified.

2.2.4 To Create a New User

You can create a new user via the **User** option in the **User Management** dialog box.



You can add a new user through two methods: create a new user; use the user already exists.

Create a new user:

1. Click **New** under the **User** option to display the **NewUser** dialog box.

2. Input the **user name** and you can also input the **full name** and **password** of this user.

3. Select a group for the new user in the **Group** dropdown list.

4. The **CreationD...** field uses the default system date and time.

5. You can also add a description of the user.

6. Click **OK**.

Use the user already exists:

1. Select a user from the user list.

2. Click **Copy** to create a copy of this user in the user list.

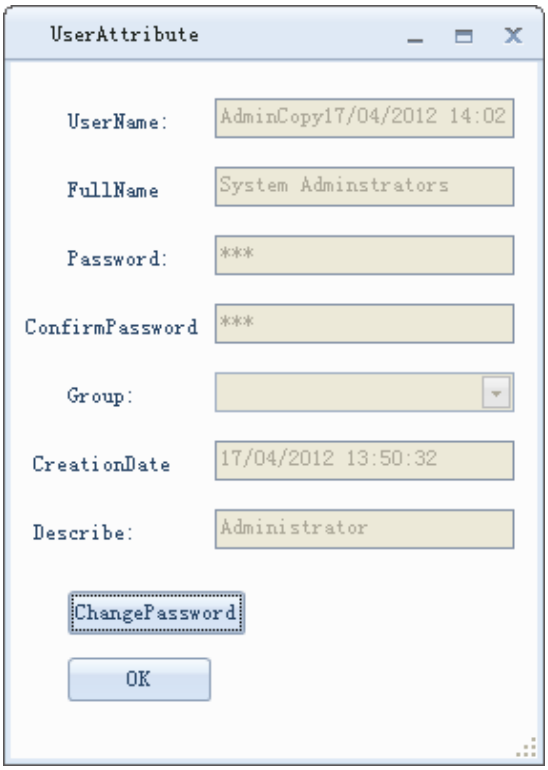
3. Select the user newly created, click **Rename** and you can modify the name of the user in the pop-up dialog box.

Tip:

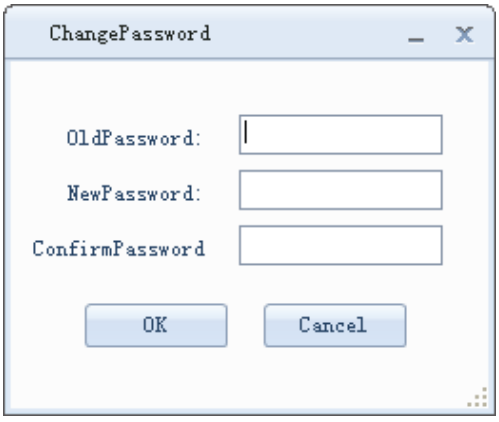
- The current user can not be deleted or renamed.

2.2.5 User Attribute

Select the desired user, click **Attribute** under the **User** option and the **UserAttribute** dialog box is displayed as shown in the figure below.

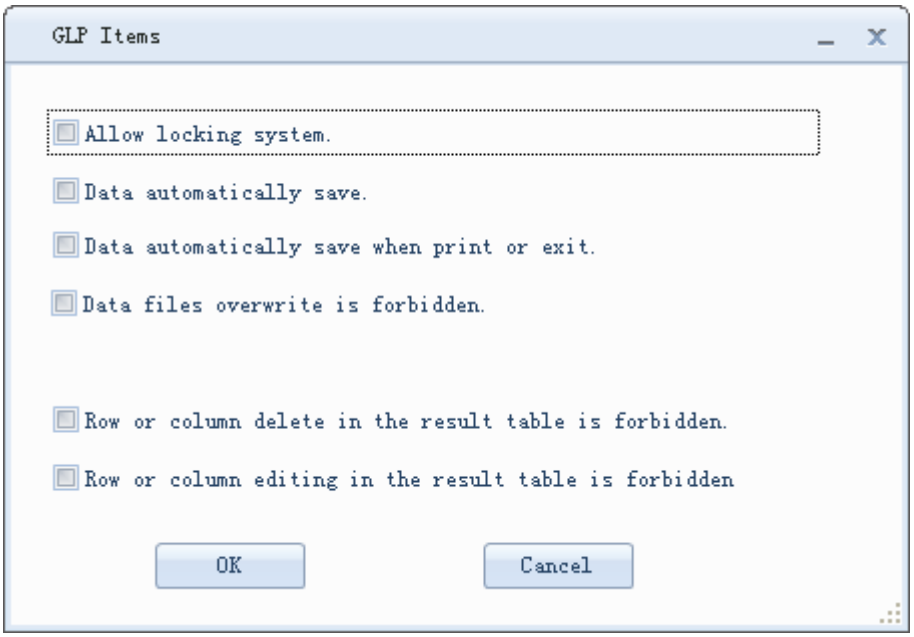


Click **ChangePassword** in the figure above and you can modify the password of this user in the pop-up **ChangePassword** dialog box as shown in the figure below. For more details, please refer to **To Change the Password**.



2.3 GLP Items

Click **GLP Items** under the **Manage** menu and you can make the following settings in the pop-up **GLP Items** dialog box. The items selected will be applied to the system.



Allow locking system

When it is selected, the system is locked and other users can not operate the system. Only the “administrator” can unlock the system.

Data automatically save

When it is selected, the processed data will be automatically stored in the default storage directory of the system.

Data automatically save when print or exit

When it is selected, the data will be automatically stored in the default storage directory of the system when you exit from the software or print data.

Data files overwrite is forbidden

When it is selected, the data files will not be overwritten; otherwise, prompt message will be displayed.

Row or column delete in the result table is forbidden

When it is selected, the rows and columns in the result table can not be deleted.

Row or column editing in the result table is forbidden

When it is selected, the rows and columns in the result table can not be edited.

Tip:

- You can not switch between GLP mode and Normal mode. To change the application mode, you need to re-install **UltraUV** and select the desired application mode.

Chapter 3 Shortcut and System Settings

This part mainly introduces the relative operations of the shortcut toolbar and system settings in the main interface of the software to help you to quickly understand their using methods.

Main topics:

- Shortcut Toolbar
- System Setting

3.1 Shortcut Toolbar

Sub-menus of the shortcut tool bar:

Menu Icon	Name	Function
	Style	Set the style of the software interface
	Connect	Build communication between **UltraUV** and the device
	Disconnect	Disconnect the communication between **UltraUV** and the device
	Goto WL	Set the system to operate under the specified wavelength
	Self Check	Perform self-check

Style

To fulfill the various needs of users, **UltraUV** provides eight interface styles including classic blue, classic silver, classic black, modern blue, modern silver, modern black, Vista and Win7.

Operation method:

Click the small arrow at the right of  to select the desired interface style.

Tip:

- You can switch the interface style at any time during your operation without affecting the operation.
- The **system-related setting** icon would change with the interface style.
- This manual adopts the default interface style (**Win7**).

Connect

Operation method:

- Connect the **PC** and the **Ultra-6000** series instrument using the corresponding data cable of the communication interface.
- Power on the instrument and turn on the power switch of the instrument.
- Click  , the software will search for device automatically and build communication between the software and the device automatically. If the device is not correctly installed, the dialog box will be displayed to tell you that the connection fails. In this situation, please refer to **Troubleshooting**.

> **Tip:**
>
> - If no device is connected, you can still run **UltraUV**, but you can only view or process data and can not make measurements.

Disconnect

If **UltraUV** will not be used to control the instrument for the moment, you can disconnect it from the device. Note that when the software is disconnected from the device, you can not make measurements via the software, but can still view or process data.

Operation method:

Click  in the shortcut toolbar to disconnect the software and the device.

> **Tip:**
>
> - You can also disconnect the software and the device by clicking  , selecting **Config Device** in the dropdown list and click **Yes** in the pop-up warning dialog box.

Goto WL

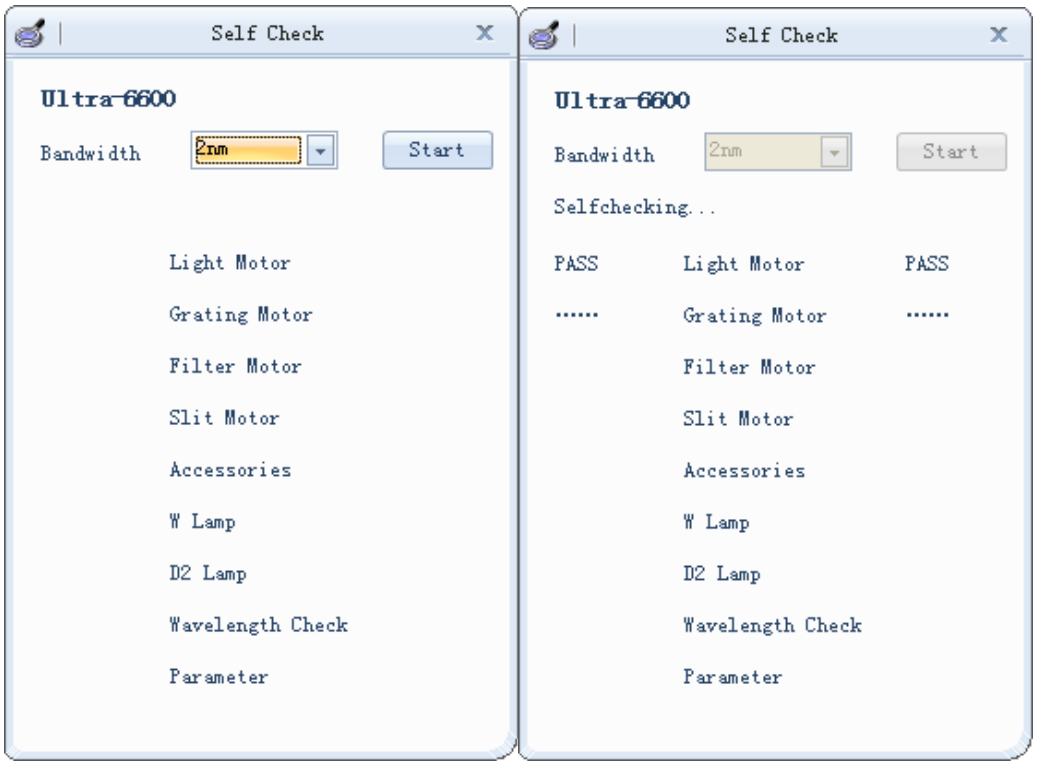
Click →λ, the **Goto WL** dialog box is displayed as shown in the figure below, you can set the wavelength and then click **OK**. At this point, the motor rotates to update the parameter, the wavelength and absorbance will be displayed in the status bar at the bottom of the interface accordingly and no operation is allowed.

Tip:

- The wavelength should be an integer between 190nm and 900nm. If the wavelength input exceeds this range or characters other than number are included, the warning dialog box will be displayed.
- This function is not available when the device is not connected.

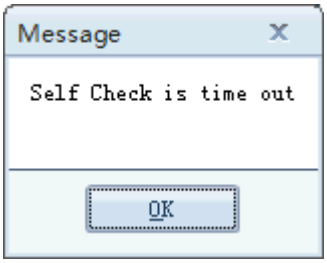
Self Check

Ultra-6000 series provides self-check function. Click in the shortcut toolbar and the dialog box as shown in the figure (left) below will be displayed. Select the spectrum bandwidth (the default is 2nm) before executing self-check. Then, click **Start** and the instrument perform self-check item by item as shown in the figure (right) below.

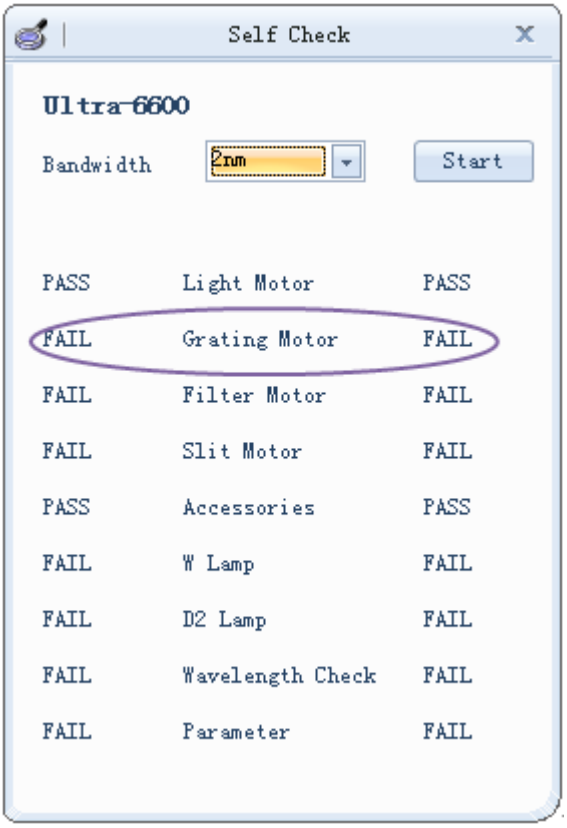


If the self-check passes, the dialog box as shown in the figure below will be displayed telling you that the self-check passes.

If the self-check times out, the dialog box as shown in the figure below will be displayed.



If the self-check fails, the dialog box displaying the failed items as shown in the figure below will be displayed. Please find and solve the problem immediately until the self-check passes.



Ultra-6600A:

Search for the initial position of each step motor; scan the zero degrees and 656.1nm of the two pre-grating; scan the zero degree, 656.1nm and 486nmof the main grating and set the wavelength to 500nm automatically.

Ultra-6600 and Ultra-6100:

Search for the initial position of each step motor; scan the zero degree, 656.1nm and 486nm of the main grating and set the wavelength to 500nm automatically.

Note:

- Do not exit the software or disconnect the software and the device during the self-check; otherwise, you can not get the self-check result and error warning will be displayed at the next start-up.
- Self-check must be performed at each start-up; otherwise, the absorbance, transmittance and reflectance measured would be inaccurate and the grating and the motor might crash during the measurement.

3.2 System Setting

Click  and make the system related settings in the pop-up dropdown menu.

Sub-menus of system setting:

Menu Icon	Name	Function
	Config Device	Select the communication port, test the communication, set the interchange wavelength and select accessories.
	Device Information	View the device information including the model, serial number, production date, DSP version, tungsten lamp information and deuterium lamp information.
	Software Setting	Set the number of digits after the decimal point and the data storage location.
	About	Display **UltraUV** information.
	Exit	Exit **UltraUV**.

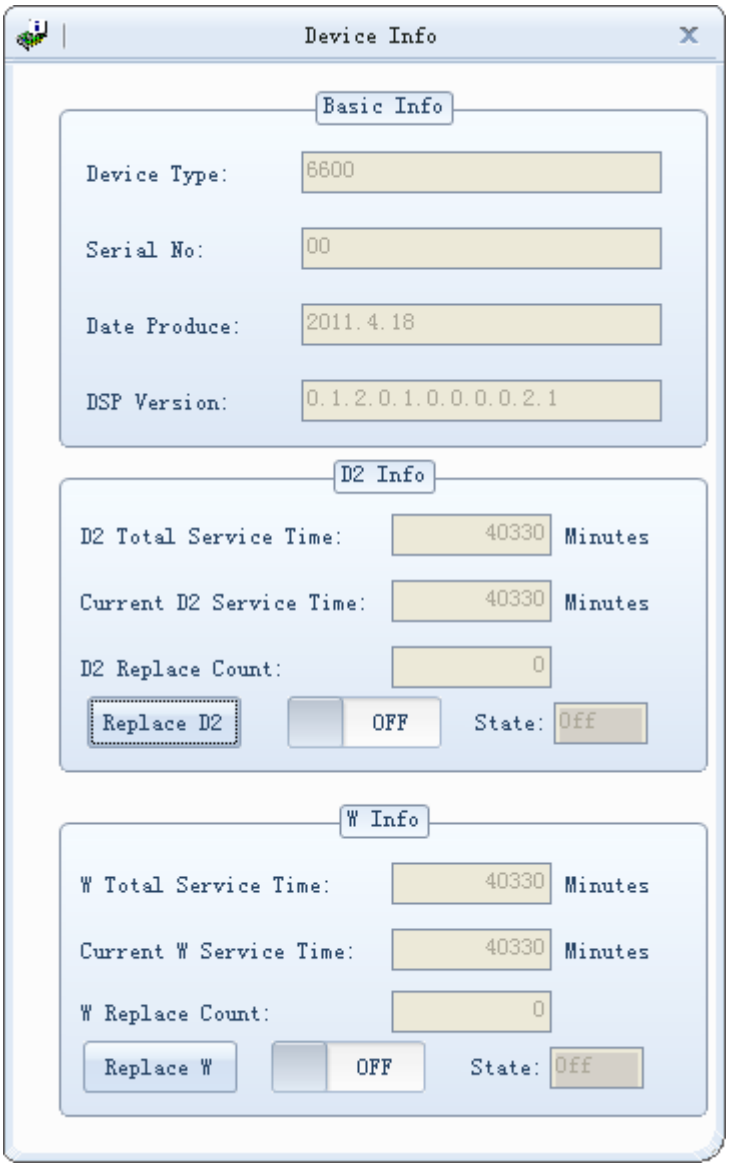
Config Device

Click  and the warning dialog box will be displayed warning you that instrument configuration would affect the software setting, all the methods and data will be abandoned and you are recommended to save them manually before configuring the instrument. Click **Yes**, the software enters the instrument configuration interface

and the connection between the software and instrument will be cut off; click **No** to give up the operation.

Device Information

After the communication between **UltraUV** and the device is successfully built, click  , and the system will acquire the information of the current device automatically as shown in the figure below.

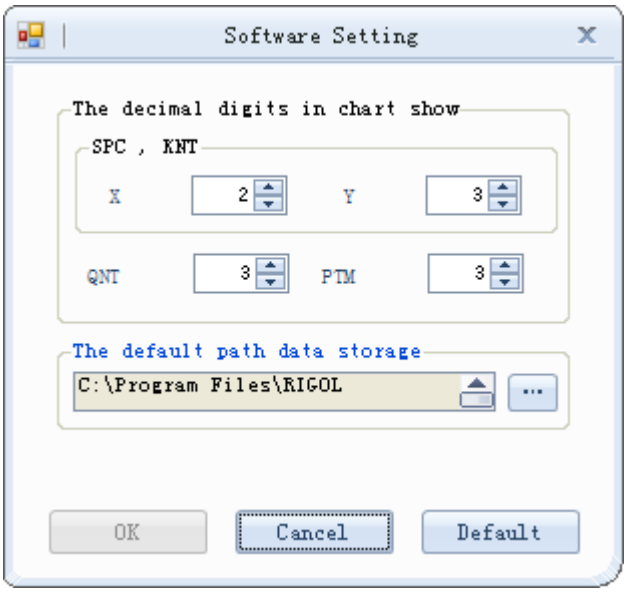


Tip:

- Make sure that the device is correctly connected before viewing the device information; otherwise, this menu is not available.

Software Setting

Before using **UltraUV** for measurement, set the software-related parameters. Click  , and the dialog box as shown in the figure below will be displayed.



The decimal digits in chart show

X

Used to set the number of digits after the decimal points of the X axis. The range is from 1 to 5 and the default is 2.

Y

Used to set the number of digits after the decimal points of the Y axis. The range is from 1 to 5 and the default is 3.

QNT

Used to set the number of digits after the decimal point in quantitation measurement. The range is from 1 to 5 and the default is 3.

PTM

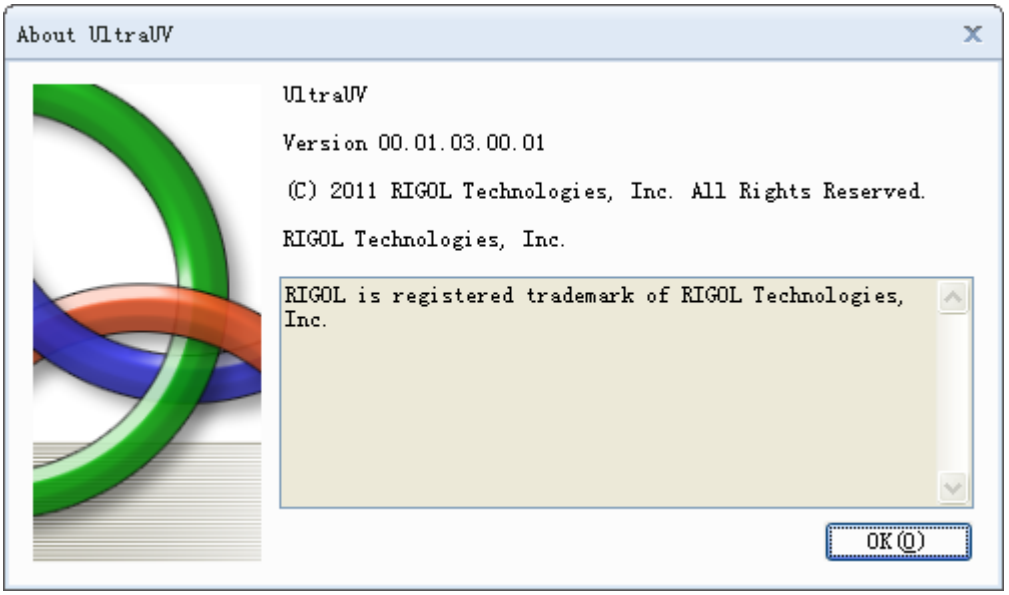
Used to set the number of digits after the decimal point in photometric measurement. The range is from 1 to 5 and the default is 3.

The default path data storage

You can select your desired storage directory or use the default storage directory (the **Data** folder under the directory of the installation file).

About

Click **About** and you can view the current version and related information of **UltraUV** in the pop-up dialog box as shown in the figure below.



Exit

To exit the software, you can click the close button at the upper right corner of the software or click **Exit**.

Tip:

- As no dialog box will be displayed and the current setting and data will not be stored automatically when closing the software, please store or back up the data before exiting the software.

Note:

- Do not exit the software or cut off the connection between the software and instrument during the measurement. Otherwise, the measurement data will be lost and abnormal prompt message will be displayed at the next start-up of the software.

Chapter 4 Measurement

The core functions of the UV-VIS spectrophotometer are to make qualitative, quantitative or structural analysis of the material on the basis of the material's selective absorption of the monochromatic light. These functions can only be realized via the software. This part introduces how to make a series of measurements using **UltraUV.**

Main topics:

- Spectrum Measurement
- Kinetic Measurement
- Photometric Measurement
- Quantitation Measurement

Tip:

- Make sure that the instrument is connected and the communication between the instrument and software is normal before making measurements.

4.1 Spectrum Measurement

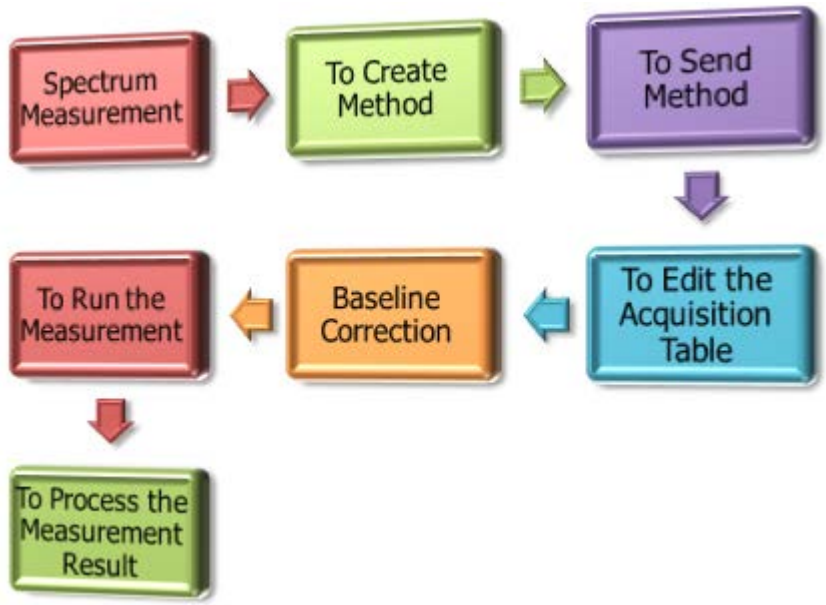
In **spectrum measurement**, the system scans and measures the absorbance and transmittance of the sample at each wavelength within the specified wavelength segment according to the specified wavelength interval and scan speed. The measurement result is the variation curve of the absorbance (transmittance or energy) under different wavelength within the wavelength segment.

The spectrum measurement is mainly used in qualitative analysis of the sample. Its direct diagram display mode makes the character of the sample clear and provides you the absorption degree of the light of the material at certain wavelength point or within certain wavelength range, making it an important function of the UV-VIS spectrophotometer.

 **Main topics:**

4.1.1 Spectrum Measurement Procedures

The procedures of the spectrum measurement using **UltraUV** are as follows.



4.1.2 To Create Spectrum Measurement Method

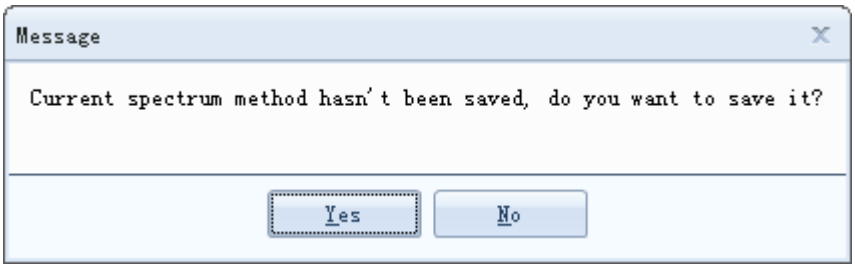
Set the method parameters before making spectrum measurement. Click 

to activate the spectrum measurement window and by default, the software switches to the method setting interface of **spectrum measurement** through which you can create a new method or open a method that already exists.

Create Method

To create a new method, click **New** under the **File** menu. The **message** dialog box will be displayed querying whether to save the current spectrum method as shown in the figure on the next page; click **Yes** to save the method in the specified directory

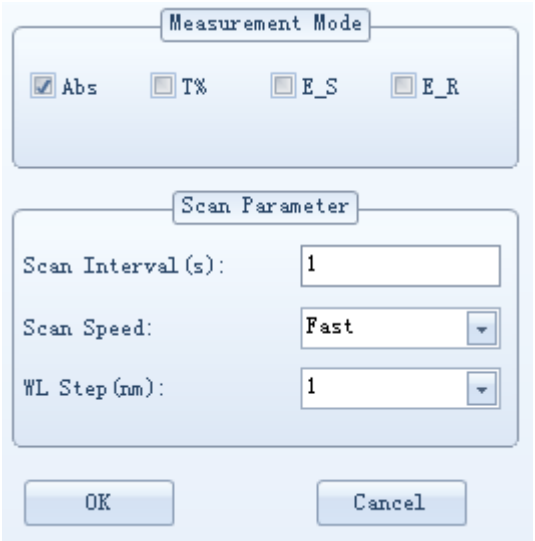
and restore the method parameters to their default values; click **No** to abandon the current spectrum method and restore the method parameters to their default values automatically.



Tip:

- You can also set or modify the method parameters directly without clicking **New**.
- If no method parameter is set, the default method parameters will be used during the measurement.

Set the Method Parameters



Measurement Mode

The spectrum measurement supports four measurement modes (**Abs** (absorbance), **T%** (transmittance), **E_S** (sample energy) and **E_R** (reference energy)). When integrating sphere is used, the **R%** (reflectance) mode is also available. Wherein, **E_S** and **E_R** modes can be selected at the same time.

Abs

Measure the sample's absorption degree of the light (the absorption of different sample of the light is different).

T%

Measure the absorption of the material of the light. The calculation formula is as follows.

Abs=-log T=-log (Es/Er)

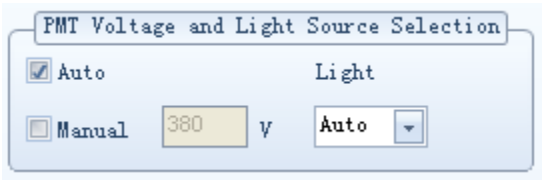
Wherein, **Es** represents the sample energy and **Er** represents the reference energy.

Note:

- The calculated absorbance should be the same with that displayed at the bottom of the interface.
- When the sample cell is hollow, the transmittance measured should be between 100.3% and 99.7% (specification: ±0.3%T).

E_S or E_R

Energy mode (sample energy or reference energy). After selecting this method, the **PMT Voltage and Light Source Selection** dialog box will be displayed at the right side and you need to set the PMT voltage and select the light source.



PMT Voltage and Light Source Selection:

Auto

When it is selected, the instrument will select voltage for the PMT automatically.

Manual

When it is selected, you need to set the PMT voltage manually. The range is from 0V to 1000V and the default is 380V.

Light

Select the PMT light source. It can be set to D2 (deuterium lamp), W (tungsten lamp), OFF (do not use light source) and Auto.

Tip:

- The PMT working voltage is related to the PMT gain. The service life of the PMT will be affected when it works under high working voltage for long periods of time and high working voltage can only be used when the energy measured is less than a certain degree.
- You are recommended to use auto light source. In auto mode, the system will select light source automatically according to the wavelength set.

Scan Parameter

Set the scan parameters including:

Scan Interval (s)

Set the scan interval when multiple scans will be performed and the unit is s. It can be set to any integer from 0 to 9999s and the default is 1.

Scan Speed

Select the speed of the scan (include slow, middle, fast and very fast). The slower the scan speed is, the closer the measured data will be to the actual value. The default is fast.

WL Step (nm)

The step of the wavelength change during the scan. It can be set to 0.05, 0.1, 0.2, 0.5, 1, 2 and 5, the unit is nm and the default is 1.

Click **OK** when the method setup is finished and the software will directly enter the acquisition interface without saving the related settings; click **Cancel** and the method parameters will be restored to their default values. You can also click **Save** in the **Method** option under the **File** menu to save the new method to the default directory, or click **Save As** to save the new method to the specified directory using the specified name.

Tip:

- If you want to use the method already exists instead of creating a new method, click **Open** in the **Method** option under the **File** menu to directly load the method already saved.

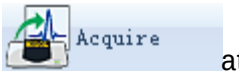
4.1.3 To Send the Spectrum Measurement Method

After setting the sample parameters, click **Send Method** under the **Acquisition** menu, **UltraUV** sends the method parameters to the instrument and the instrument receives and records the method parameters set.

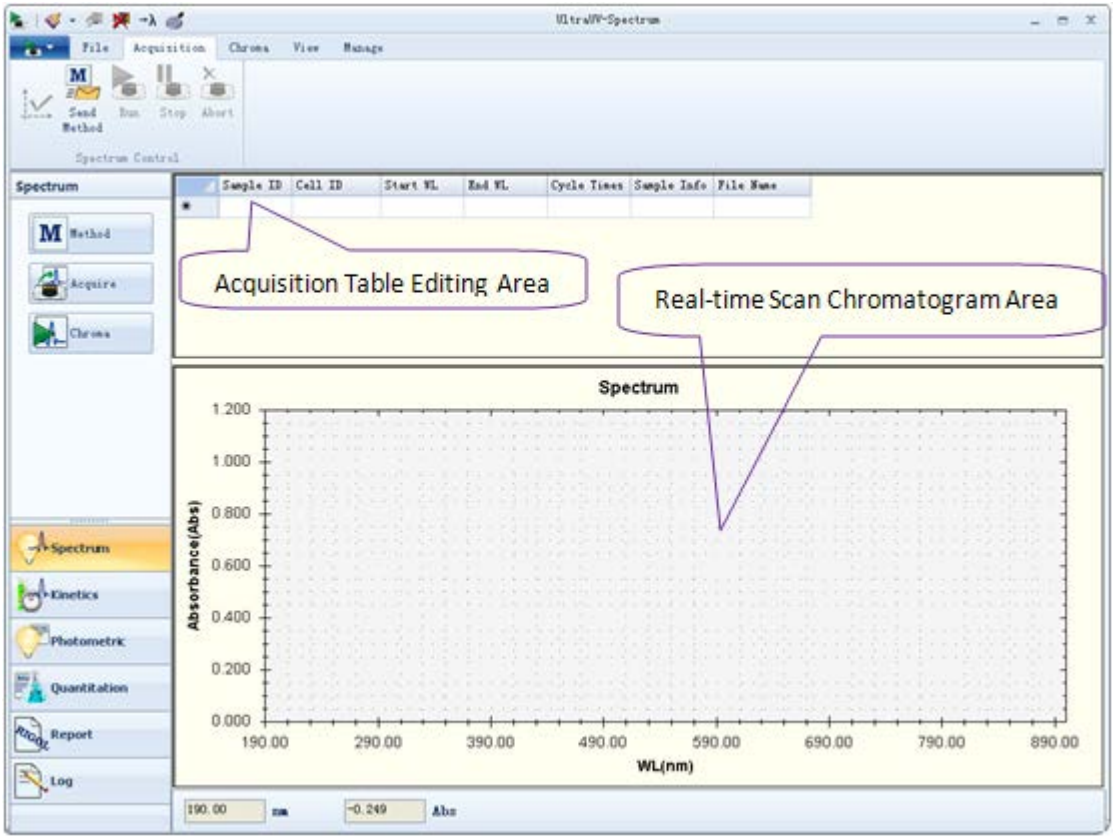
Tip:

- You need to send the method again if the method parameters are changed after sending the method; otherwise, the system will make measurement according to the previous method.

4.1.4 To Edit the Acquisition Table of the Spectrum Measurement

Click 

at the left of the spectrum measurement interface or click **OK** after setting the method parameters of the spectrum measurement to enter the acquisition interface. The acquisition interface consists of the **Acquisition Table Editing Area** and the **Real-time Scan Chromatogram Area** which are used to edit the related parameters of the acquisition table and display the measured chromatogram respectively as shown in the figure below.



Acquisition Table Editing Area

Edit the acquisition table. If not, the baseline correction and measurement can not be performed.

Sample ID

Set the name of the sample. If you do not set the sample ID, the default value will be used ("Sample" plus the line number, for example, Sample1). If single cell is selected, you can only set one sample; if 8-series multicell is used, up to 8 samples can be edited.

Tip:

- After setting the sample ID, press **Enter** on the keyboard to change to the next sample ID; press **Tab** to directly switch to the cell ID input box (and so on); press the direction keys on the keyboard to make corresponding switches.

Cell ID

Select the cell number. The cell number can not be input manually and you need to select the cell number from the dropdown arrow in the input box. If single cell is selected, the cell ID can only be set to 1; if 8-series multicell is used, it can be set to 1 to 8.

Start WL or End WL

Set the start wavelength or end wavelength when scanning the sample. They can be set to any integer between 190nm and 900nm and the defaults are 890nm and 880nm respectively. Note that the start wavelength must be greater than the end wavelength (scan from long wave to short wave); otherwise, prompt message will be displayed when sending the method. As the absorbance of the sample at different wavelength is different, you are recommended to set the start wavelength and end wavelength according to the characteristics of the sample.

Cycle Times

Set the number of times of the scan of the sample and it can be set to any integer between 1 and 10.

Sample Info

Input the remark (explanatory description) of the sample, for example, the sample submitter, date of sample submitted, sample name, dilutability, standard sample or not and concentration.

File Name

The name of the data file storing the measurement result after the measurement. If no data file name is specified, the measurement result will be stored in "Sample1Year-Month-Date-Hour-Minute-Second" format automatically.

Note:

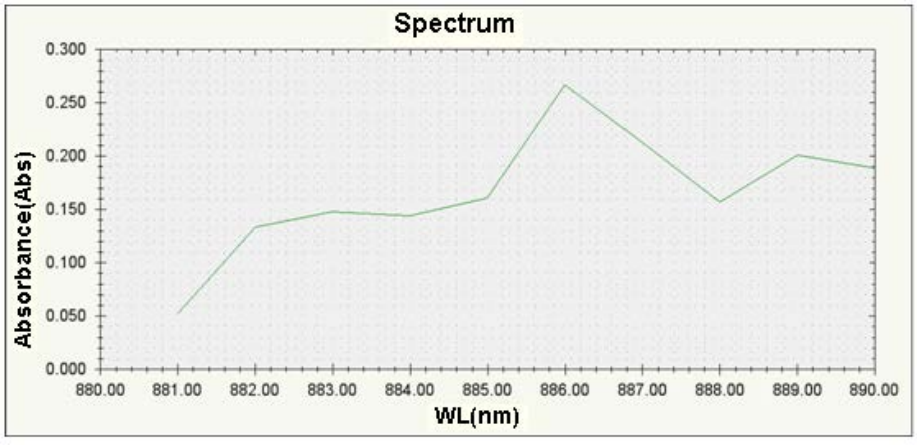
- You need to edit the acquisition table before executing spectrum measurement.
- In spectrum measurement, up to 8 samples can be measured in one measurement and you will not be informed to change the sample during the measurement.
- The data file name conforms to the Windows standard naming rules. Its length can not exceed 256 characters and the file name can be English letters, numbers, ￥@&＋（）, underscore, space and Chinese characters, but "**：？ \ * | < > : /**" can not be used.

Tip:

- When scanning the same sample, you only need to set the cycle times instead of setting the measurement method again.

Real-time Scan Chromatogram Area

The sample data changes accordingly during the measurement and the result acquired is displayed in this area in figure form accordingly.



4.1.5 To Execute the Baseline Correction of Spectrum Measurement

Baseline correction sets the background within the wavelength range currently selected to zero and all the readings within this range will be affected. Baseline correction ensures better reference point in data acquisition.

After setting the sample parameters, click  under the **Acquisition** menu, the instrument starts to execute baseline correction and the prompt dialog box is displayed. Baseline correction covers all the wavelengths, performs correction at certain scan speed and step and displays the current wavelength and the corresponding absorbance accordingly.

Tip:

- The baseline correction adopts 1nm wavelength step.
- After finishing the baseline correction and closing the software, baseline correction is required at the next measurement, as the software does not record the last operation.
- Execute baseline correction again when the slit width, scan speed, wavelength range, sample interval and the accessory of the sample operation changed.
- Set the sample parameters before executing the baseline correction. During the correction, other operations are disabled.

4.1.6 To Run Spectrum Measurement

After the baseline correction is finished, click **Run** under the **Acquisition** menu, the instrument makes measurement according to the parameters set and the measured data is displayed in the **Real-time Scan Chromatogram Area** in curve form.

After the measurement is finished, **UltraUV** switches to the chromatogram interface automatically. The measurement result is displayed at the right side of the interface

in chromatogram form. At the same time, the current wavelength and absorbance are displayed in the status bar in the main interface.

Tip:

- This function is only available after sending the method.
- You can click **Stop** or **Abort** to stop the measurement during the measurement.
- Do not turn off the software or the instrument during the measurement, otherwise, the measurement result will be lost and abnormal prompt message will be displayed at the next start-up of the software.

4.1.7 To Stop Spectrum Measurement

Click **Stop** or **Abort** under the **Acquisition** menu to stop the current measurement. The measurement stopped can not be resumed and you need to send the method again and restart the measurement.

The difference between Stop and Abort

Stop

The instrument stops the measurement and saves the measurement data. The software switches to the chromatogram interface and you can process the spectrum data measured.

Abort

The instrument stops the measurement without saving the measurement data.

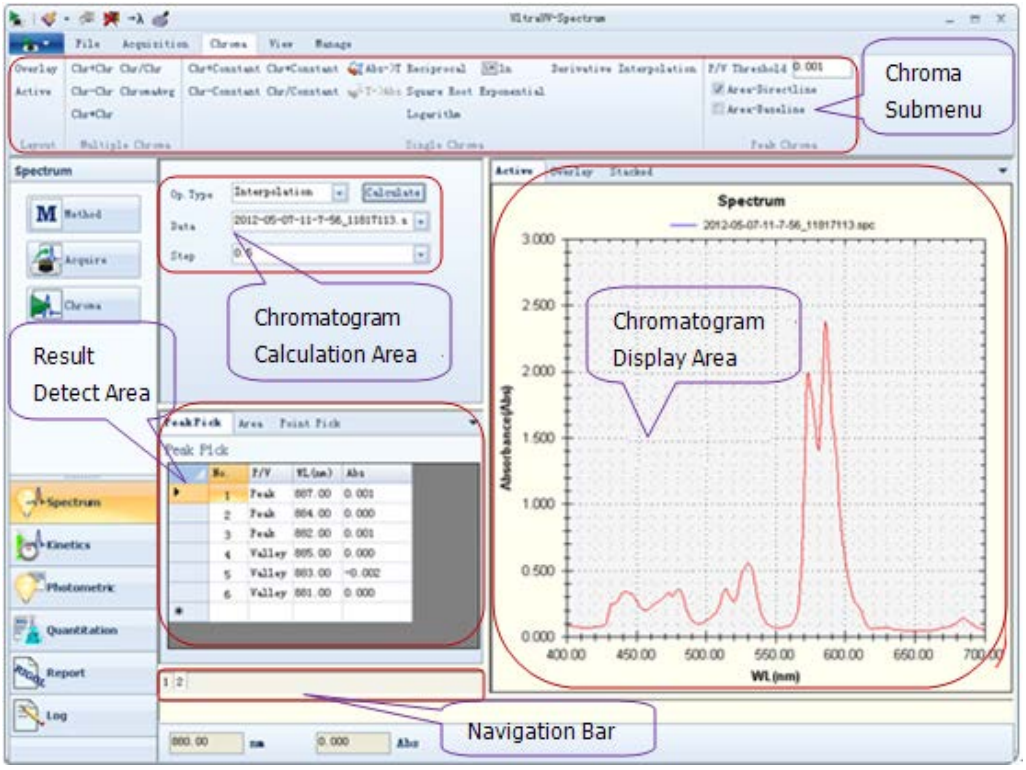
Note:

- The **Stop** or **Abort** operation is only available after sending the method and starting the measurement.

4.1.8 Chromatogram Processing of the Spectrum Measurement

After the spectrum measurement finishes, the measurement results are saved in the default storage directory of the system and **UltraUV** switches to the 

interface automatically as shown in the figure on the next page. You can process the chromatogram measured and save the results (operation method: click **Save** in the **Chroma** option under the **File** menu to save the current chromatogram in the default directory; or click **Save As** to save the chromatogram under the specified directory using the specified name). Besides, you can also process the scan chromatogram saved (operation method: click **Open** in the **Chroma** option under the **File** menu to select the chromatogram to be processed).



Main topics:

- Chromatogram Operations of Spectrum Measurement
- Operation Result Detect of Spectrum Measurement
- Chromatogram Display Setting of Spectrum Measurement
- Follow-up Operations of Chromatogram

Tip:

- If no chromatogram is currently opened, chromatogram processing can not be performed. The chromatograms currently opened will be numbered and displayed in the **navigation** bar according to the order in which they are opened. You can click the numbers to switch among the chromatograms and at most, 16 curves can be displayed at the same time.
- Click **Close** in the **Chroma** option under the **File** menu to close the current chromatogram; click **Close All** to close all the chromatograms opened.

4.1.8.1 Chromatogram Operations of Spectrum Measurement

Operation types of spectrum measurement:

- Interpolation
- Datasets Operation
- Arithmetic
- Transform
- Ensemble Average

Tip:

All the operation types are not available when the measurement mode is **E_S** or **E_R**.

4.1.8.1.1 Interpolation

Perform interpolation operation on the measurement result to get measurement values with relatively smaller sample interval. You need to set the related parameters after selecting the interpolation operation.

Data

Select the desired chromatogram. If no chromatogram is currently opened, the data list is blank and interpolation operation can not be performed. Click **File** and open a chromatogram from the **Chroma** option.

Step

Select the interval (0.05, 0.1, 0.2, 0.5 and 1).

Calculate

Click this button and the software calculates the interpolation automatically. The calculation result will be displayed in the **Chromatogram Display Area** in chromatogram form. To distinguish the chromatograms before and after the operation, the filename of the calculated chromatogram is "the file name of the **Data** plus the specific system time at the calculation" and the calculated chromatogram is marked with different color. When using the interpolation operation again, this chromatogram will appear in the **Data** list.

Tip:

- You can also click **Interpolation** under the **Chroma** menu to directly enter the interpolation setting menu.
- Interpolation operation can not be performed when the interpolation interval is greater than the sample rate.

4.1.8.1.2 Datasets Operation

Perform datasets operation on the chromatogram file measured. You need to set the related parameters when datasets operation is selected.

DatasetA

Select the chromatogramA for the datasets operation.

Operation

Select the operator ("+, -, *, /" corresponding to the buttons in the **Multiple Chroma** option under the **Chroma** menu, you can also click the corresponding button directly for shortcut setting).

DatasetB

Select the chromatogramB for datasets operation.

Calculate

Click this button and the software calculates automatically according to the setting. The calculation results will be displayed in the **Chromatogram Display Area** in chromatogram form. The filename of the calculated chromatogram is "the filename of **DatasetA** plus the specific system time at the calculation" and the calculated chromatogram is marked in different color. When you perform datasets operation again, this chromatogram will appear in the **Data** list.

Note:

- In data processing, the datasets arithmetic operation is only available for the same measurement mode (such as absorbance or transmittance).
- Datasets arithmetic operation is only available for the intersection between the datasets.
- For datasets operation, the datasets selected must have the same wavelength range and sample interval.
- To perform the operation, **DatasetA** and **DatasetB** must be selected.

4.1.8.1.3 Arithmetic

Perform arithmetic operation on the dataset measured and constant. You need to set the related parameters when arithmetic operation is selected.

Data

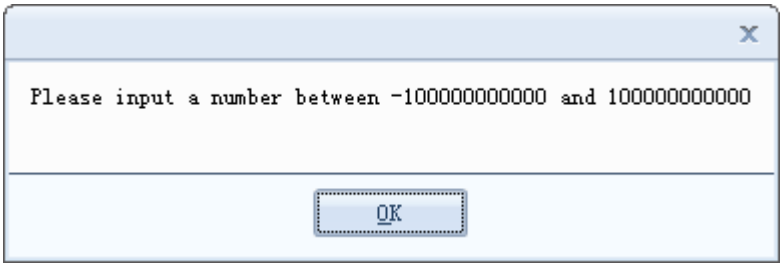
Select a chromatogram to perform arithmetic operation.

Operation

Select the operator ("+, -, *, /" corresponding to the buttons in the **Multiple Chroma** option under the **Chroma** menu, you can also click the corresponding button directly for shortcut setting).

Constant

Set the constant. The range is any integer between -100,000,000,000 and 100, 000,000,000. If the constant input exceeds this range, the prompt message will be displayed after clicking **Calculate**.



Calculate

Click this button and the software calculates automatically according to the setting. The calculation results will be displayed in the **Chromatogram Display Area** in chromatogram form. The filename of the calculated chromatogram is "the filename of **Data** plus the specific system time at the calculation" and the calculated chromatogram is marked in different color. When you perform arithmetic operation again, this chromatogram will appear in the **Data** list.

4.1.8.1.4 Transform

Perform transform between different measurement modes and save the result as a new file. You need to set the related parameters when transform is selected.

Data

Select the desired chromatogram.

Transform

The transform types available include Derivative, Logarithm, Reciprocal, T->Abs (or Abs->T), Pow, Square Root, ln and Exponential corresponding to the buttons in the **Single Chroma** area under the **Chroma** menu (you can also click the corresponding button directly for shortcut setting).

Calculate

Click this button and the software calculates automatically according to the setting. The calculation results will be displayed in the **Chromatogram Display Area** in chromatogram form. The filename of the calculated chromatogram is "the filename of **Data** plus the specific system time at the calculation" and the calculated chromatogram is marked in different color. When you perform transform operation again, this chromatogram will appear in the **Data** list.

Note:

- When the measurement mode is **Abs**, **T->Abs** transform is not available; when the measurement mode is **T%**, **Abs->T** transform is not available.

4.1.8.1.5 Ensemble Average

Perform average on multiple chromatograms. You need to set the related parameters when ensemble average is selected.

Op. Type

Select **Ensemble Average** from the operation type dropdown box. You can also click **ChromaAvg** in the **Multiple Chroma** area for shortcut setting.

Data

Select the desired chromatogram from the **Data** dropdown box. At this point, the filenames of the chromatograms belonging to the same type with the chromatogram selected will be displayed in the textbox below. You can check the chromatograms for ensemble average.

Calculate

Click this button and the software calculates automatically according to the setting. The calculation results will be displayed in the **Chromatogram Display Area** in chromatogram form. The filename of the calculated chromatogram is "the filename of **Data** plus the specific system time at the calculation" and the calculated chromatogram is marked in different color. At the same time, the filename of this chromatogram will appear in the **Data** list and the textbox below.

Note:

- The chromatograms for the ensemble average must have the same measurement mode, wavelength range and step.

4.1.8.2 Operation Result Detect of Spectrum Measurement

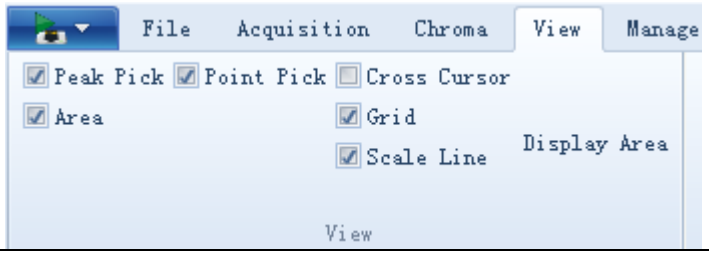
This section mainly introduces how to detect the measurement results.

Detect modes:

- Peak Pick Detect
- Peak Area Detect
- Point Pick Detect

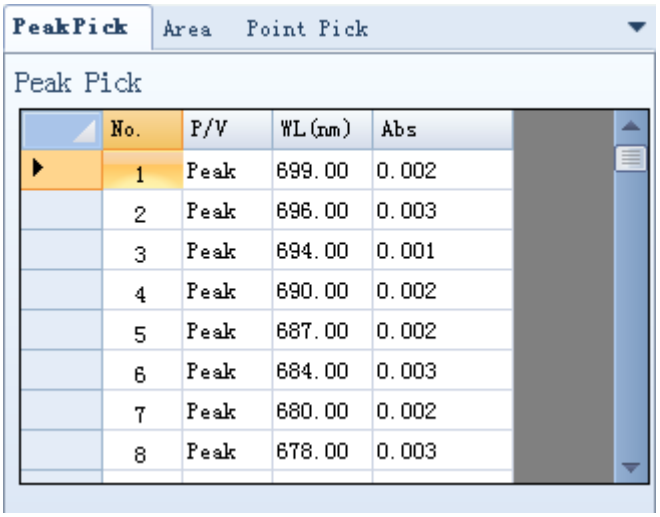
Note:

- You must activate the corresponding detect mode before performing result detect. Operation method: click **View** in the menu bar and check the desired detect mode in the **View** option as shown in the figure below.



4.1.8.2.1 Peak Pick Detect

The peak pick detect table, being displayed in the **Result Detect Area** of the chromatogram operation interface, displays all the peaks/valleys in the dataset as well as the wavelength and transmittance (or absorbance) of each peak/valley. After the measurement is finished, the system detects the peak/valley automatically and displays the results in the peak pick detect table as shown in the figure below.



No.	P/V	WL(nm)	Abs
1	Peak	699.00	0.002
2	Peak	696.00	0.003
3	Peak	694.00	0.001
4	Peak	690.00	0.002
5	Peak	687.00	0.002
6	Peak	684.00	0.003
7	Peak	680.00	0.002
8	Peak	678.00	0.003

P/V Threshold

The P/V threshold is the standard used to determine the peak and noise. Glitches can be filtered out if proper threshold is set. Input the desired threshold in the P/V threshold input box in the **Peak Chroma** option under the **Chroma** menu, the range is from 1e-7 to 100 and the default is 0.001.

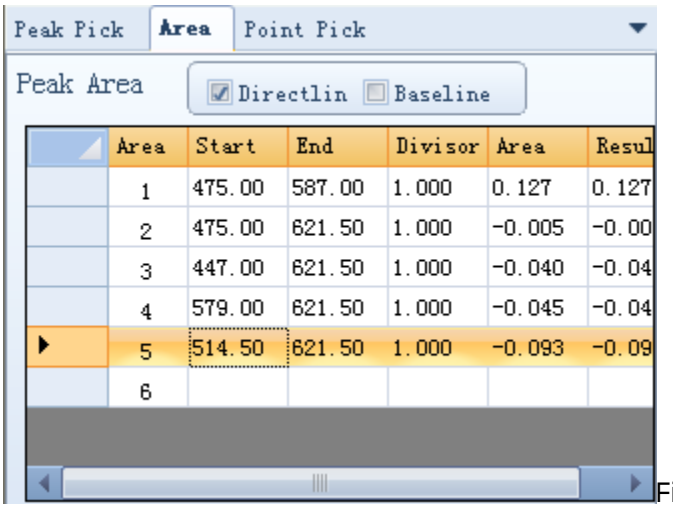
Tip:

- The peak pick detect table would change with the P/V threshold. The greater the threshold is, the fewer peaks/valleys will be detected.
- When the measurement mode is **E_S** or **E_R**, peak pick detect is not available.

4.1.8.2.2 Peak Area Detect

Peak area is used to calculate the area of the region under the curve. Peak area can contain one or more regions and each region corresponds to one line in the peak area detect table which also includes the start wavelength and end wavelength used to define a region. Input the start wavelength and end wavelength of a region and the area column would return the area of that region. For any dataset opened, you can define desired number of regions for it.

Click **Area** in the **Result Detect Area** and the peak area detect table will be displayed as shown in the figure (a) below. In **Active** mode, two reading lines will appear in the chromatogram display area as shown in the figure (b) and you can use the reading lines to define regions on the chromatogram or input the start wavelength and end wavelength manually in the peak area detect table; while in **Overlay** and **Stacked** modes, you can only input the start wavelength and end wavelength manually in the peak area detect table.



	Area	Start	End	Divisor	Area	Resul
	1	475.00	587.00	1.000	0.127	0.127
	2	475.00	621.50	1.000	-0.005	-0.00
	3	447.00	621.50	1.000	-0.040	-0.04
	4	579.00	621.50	1.000	-0.045	-0.04
▶	5	514.50	621.50	1.000	-0.093	-0.09
	6					

Figure (a)

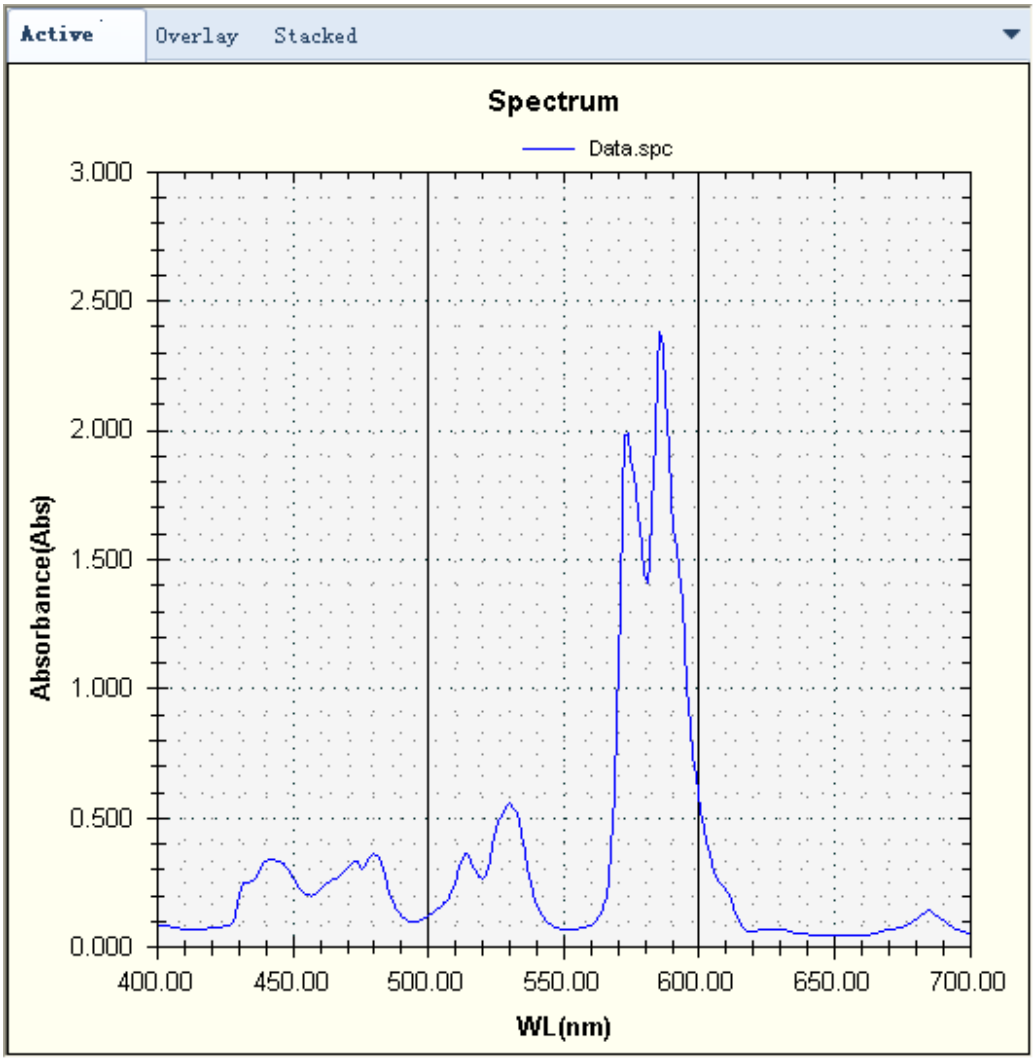


Figure (b)

Directlin

Connect the start wavelength point and the end wavelength point and calculate the area of the region formed by the curve and the connecting line. The area above the connecting line is positive and the area under the connecting line is negative. Therefore, the area calculated might be negative.

Baseline

Area formed by the two reading lines, curve and the X axis.

Divisor

Used for the proportion calculation of the area and the default is 1.
Result=Area/Divisor (the divisor can not be zero).

Tip:

- When switching between the **Directlin** and **Baseline** modes, the area calculated and the result will change accordingly.
- When both **E_S** and **E_R** are selected as the measurement modes, both the **E_S** area and the **E_R** area will be displayed after inputting the start wavelength and end wavelength.
- The range of the start wavelength and end wavelength is from the start value to the end value of the chromatogram curve and prompt message will be displayed if the wavelength input exceeds this range.

4.1.8.2.3 Point Pick Detect

Used to read the measurement values of the corresponding points on the data curve measured.

Click **Point Pick** in the **Result Detect Area** and the point pick detect table as shown in the figure (a) below will be displayed. In **Active** mode, a reading line will appear in the chromatogram display area as shown in the figure (b). You can define different wavelength on the chromatogram using the reading line or input the wavelength manually in the point pick detect table; while in **Overlay** and **Stacked** modes, you can only input the wavelength manually in the point pick detect table.

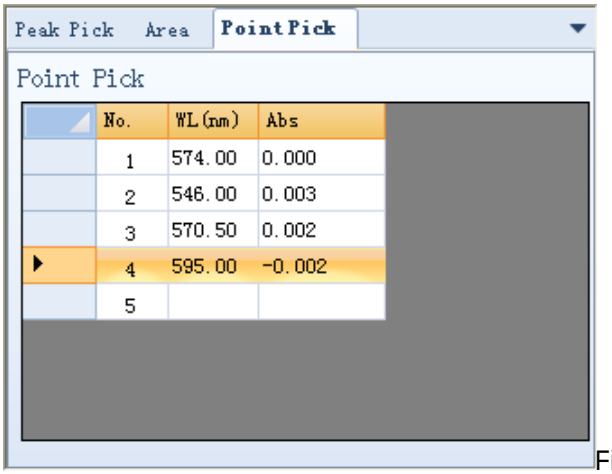


Figure (a)

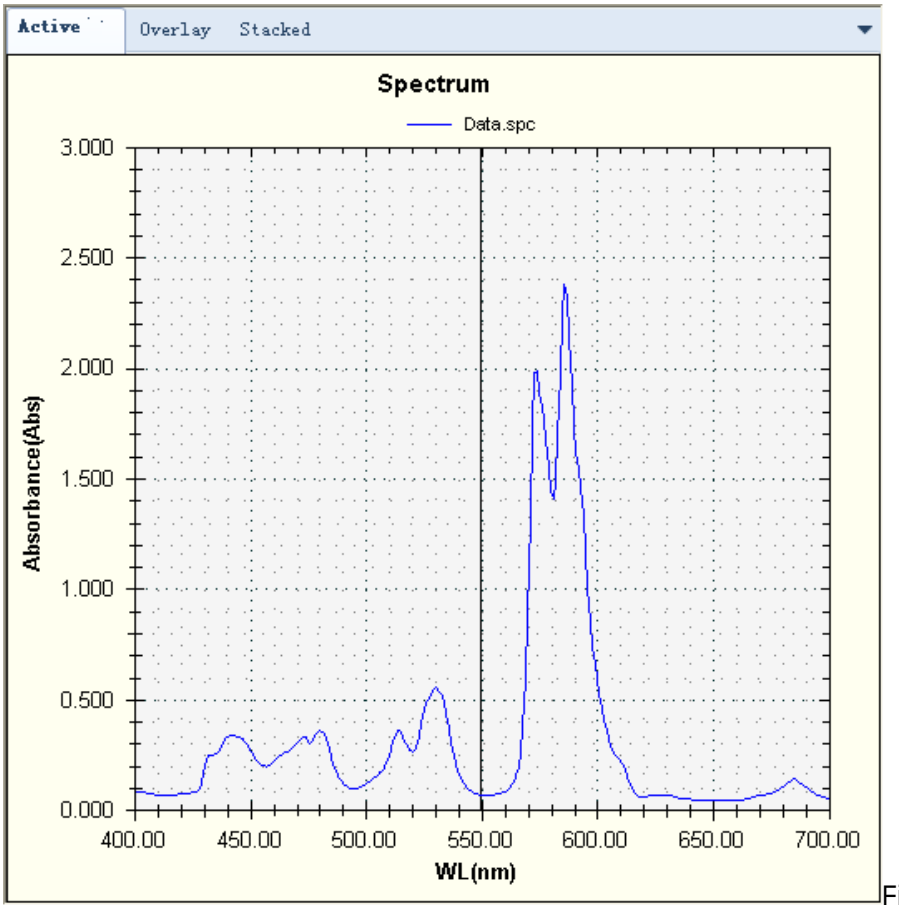


Figure (b)

Tip:

- When both **E_S** and **E_R** are selected as the measurement modes, both the sample energy and the reference energy will be displayed after inputting the wavelength (within the curve range).
- Click at the upper right corner of the result detect area and you can also switch among the **peak pick**, **peak area** and **point pick** interfaces in the pop-up dialog box.
- The wavelength range is from the start value to the end value of the chromatogram curve and prompt message will be displayed if the input wavelength exceeds this range.

4.1.8.3 Chromatogram Display setting of Spectrum Measurement

You can set the chromatogram interface for easier measurement results analysis. Besides, you can also perform some shortcut operations such as store and print. **UltraUV** supports three chromatogram display types (**Active**, **Overlay** and **Stacked**).

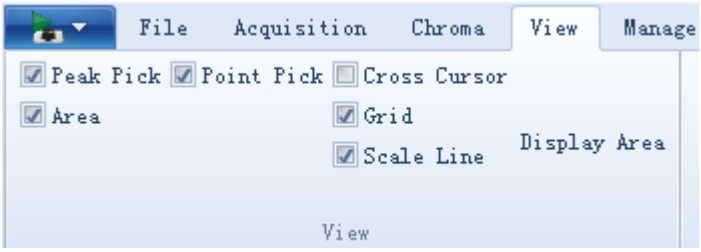
Main topics:

- Chromatogram Interface Setting
- Active
- Overlay
- Stacked

4.1.8.3.1 Chromatogram Interface Setting

After the data processing is finished, you can set the axis, curve background and the size of the chromatogram interface. For details, refer to the introductions below.

Click **View** and you can perform the following settings in the **View** option.



Cross Cursor

When it is checked, the cross cursor appears on the chromatogram. Right-click in the chromatogram display area and select **Show Point Values** in the pop-up dialog box as shown in the figure (a) below. At this point, when the cross cursor is placed on the measured data point, the data filename of the curve and the axis values of that point will be displayed as shown in the figure (b).

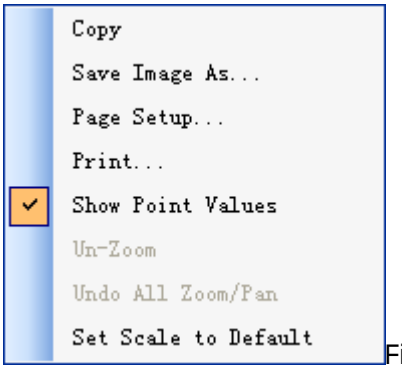


Figure (a)

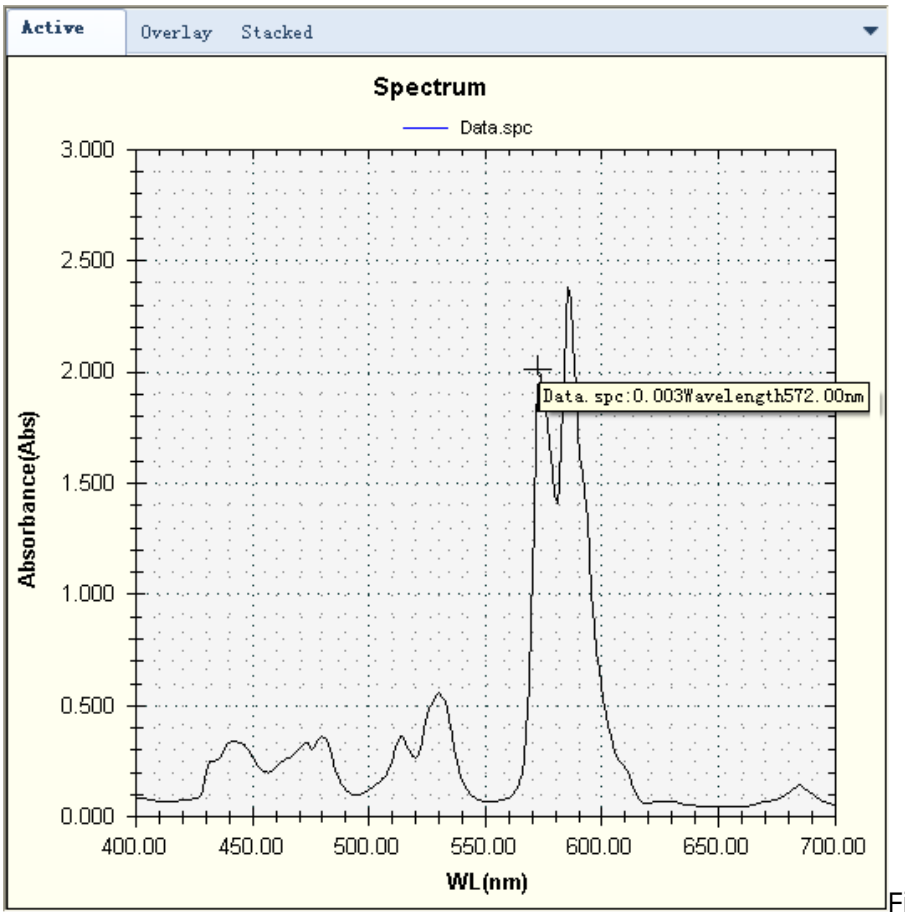


Figure (b)

Grid

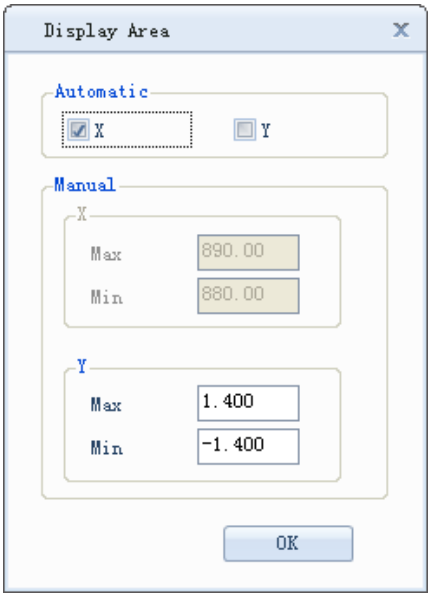
After it is checked, the grid is displayed and you can easily view the axis values of each data point.

Scale Line

After it is checked, the scale line will be displayed on the X axis and Y axis.

Display Area

Click **Display Area** and the display area dialog box is displayed. You can set the scaleplate automatically or manually adjust the axis range.

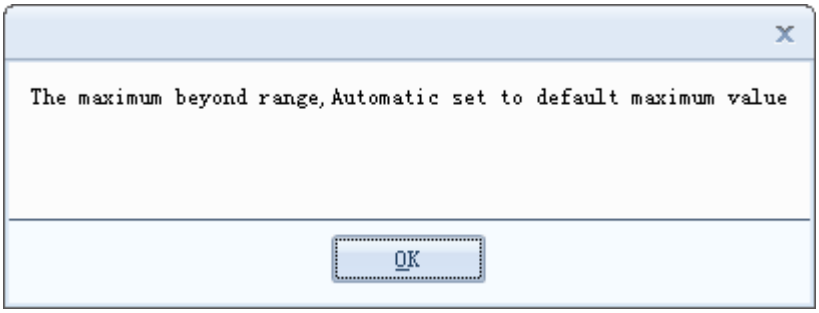


Automatic

You can set X axis or Y axis to automatic. When it is checked, the corresponding setting field in the manual adjustment is disabled.

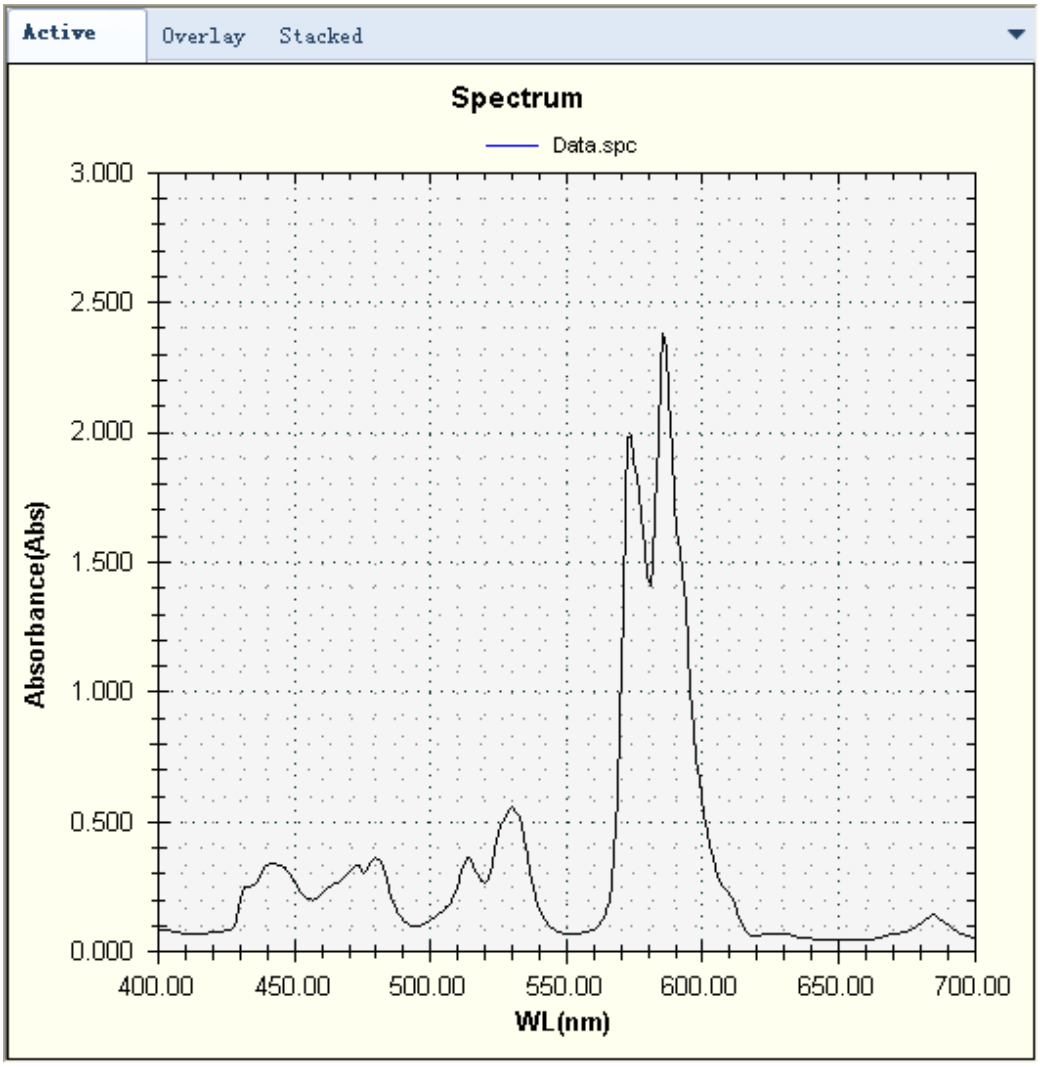
Manual

You can set the maximum and minimum values of the X axis and Y axis manually. The maximum and minimum values can not exceed the current coordinate range; otherwise, the following dialog box will be displayed.



4.1.8.3.2 Active

Display the chromatogram currently measured or processed as shown in the figure below.



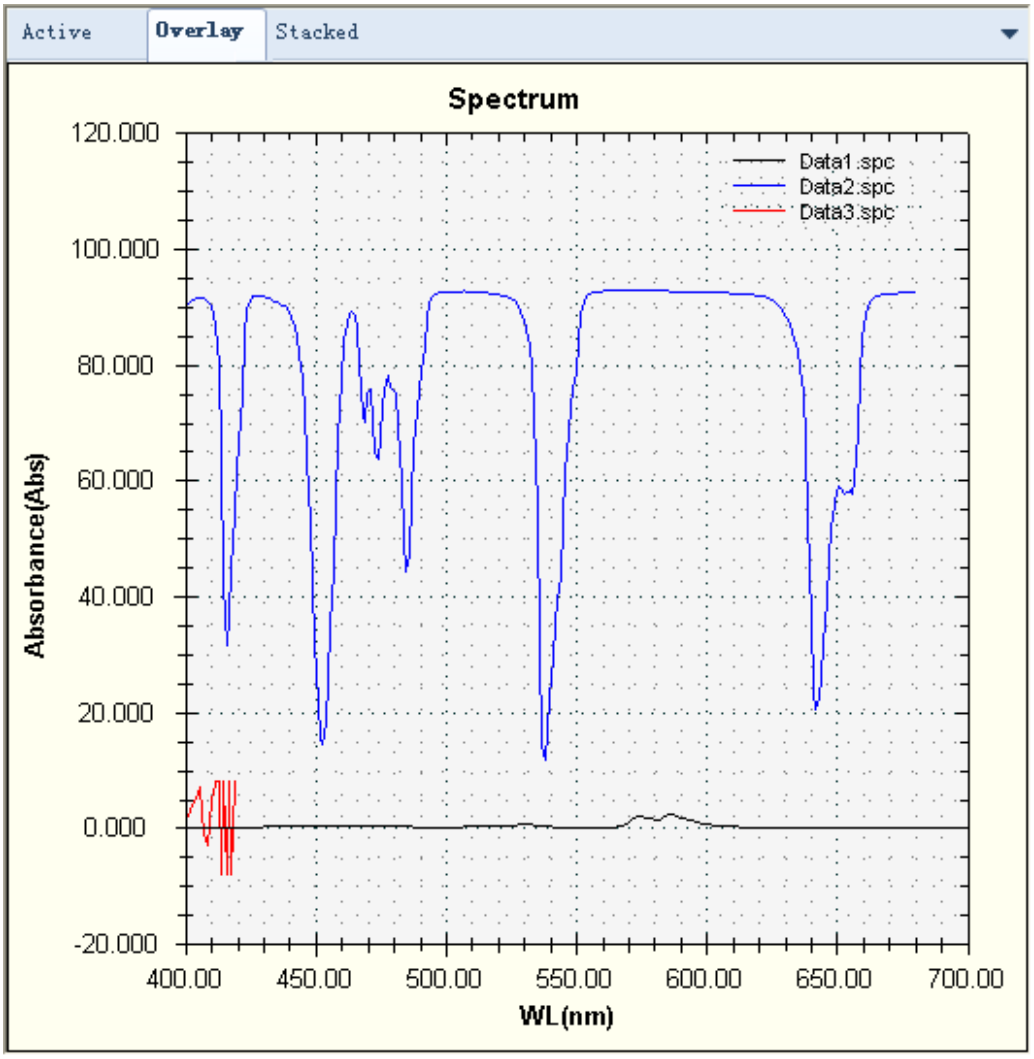
Tip:

- In this mode, if you want to view a wavelength value in details, you can rotate the mouse wheel or select this region using the mouse to zoom out or in this region.
- Click the number in the navigation bar to activate the corresponding chromatogram data currently displayed in the interface.

Right-click in the chromatogram display area and you can perform a series of follow-up operations on the chromatogram via the pop-up dropdown list. For the details, refer to Follow-up Operations of Chromatogram.

4.1.8.3.3 Overlay

All the images measured or opened overlap and are displayed in the same chromatogram in different colors.



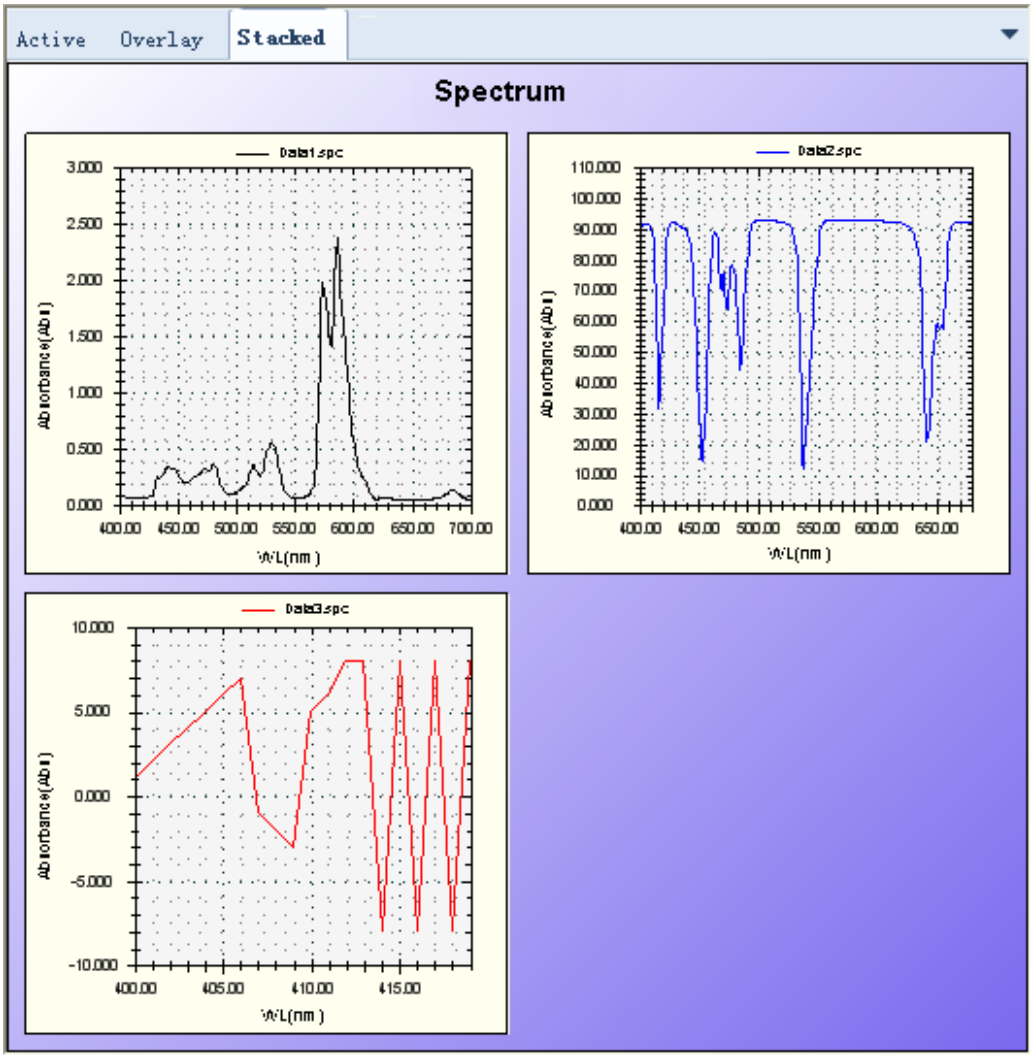
Tip:

- In this mode, if you want to view a wavelength value in details, you can rotate the mouse wheel or select this region using the mouse to zoom out or in this region.

Right-click in the chromatogram display area and you can perform a series of follow-up operations on the chromatogram via the pop-up dropdown list. For the details, refer to Follow-up Operations of Chromatogram.

4.1.8.3.4 Stacked

Display all the images measured or opened in stacked form to facilitate your comparison of data as shown in the figure below.



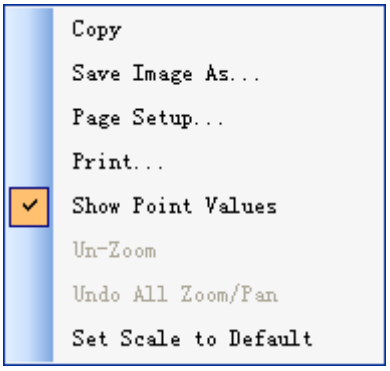
Tip:

- In this mode, if you want to view a wavelength value in details, you can rotate the mouse wheel or select this region using the mouse to zoom out or in this region.
- Click at the upper right corner in the figure above to switch among **Active**, **Overlay** and **Stacked** Interfaces via the pop-up dialog box.

Right-click in the chromatogram display area and you can perform a series of follow-up operations on the chromatogram via the pop-up dropdown list. For the details, refer to Follow-up Operations of Chromatogram.

4.1.8.4 Follow-up Operations of Chromatogram

Right-click in the chromatogram display area and you can perform a series of follow-up operations of the chromatogram via the pop-up dropdown list.



Copy

Click **Copy** and the current chromatogram will be copied onto the clipboard. You can easily use the current chromatogram for demonstration, report and writing.

Save Image As...

Save the current chromatogram in the specified location. The formats supported include emf, PNG, Gif, Jpg and Bmp.

Page Setup.../Print...

If printer is currently connected to your computer, you can set the page format and print the current chromatogram.

Show Point Values

The axis values of the point will be displayed when the cross cursor is placed on the data point.

Un-Zoom

Restore the chromatogram zoomed in or out proportionately.

Undo All Zoom/Pan

Restore the chromatogram to the size before the zoom-in and zoom-out.

Set Scale to Default

Restore the chromatogram to the default size.

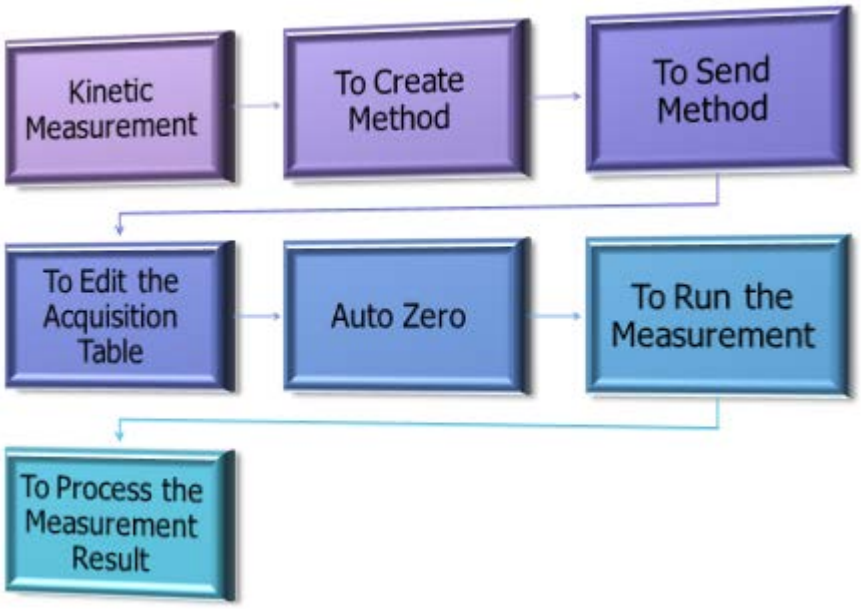
4.2 Kinetic Measurement

In **kinetic measurement**, system samples data continuously at certain time interval and displays the data sampled in figure form. It is mainly used to measure the absorbance or transmittance of the sample that changes with time at certain wavelength. The measurement result is the variation curve of the absorbance, transmittance or energy of the sample with the time at certain wavelength.

In kinetic measurement, you can view the variation tendency of the sample with the time. It is usually used to measure the variation fluctuation of the material during some chemical reactions and determine within which period of time new material is generated according to the fluctuation.

 **Main topics:**

4.2.1 Kinetic Measurement Procedures

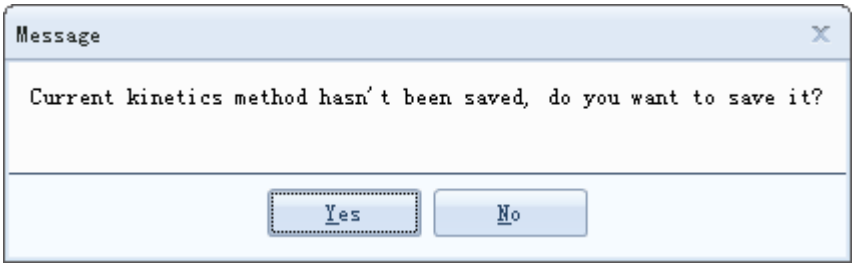


4.2.2 To Create Kinetic Measurement Method

Set the method parameters before performing kinetic measurement. By default, the software enters the **UltraUV-kinetic measurement interface** at start-up. You can create a new method or open a method already exists through this interface.

Create Method

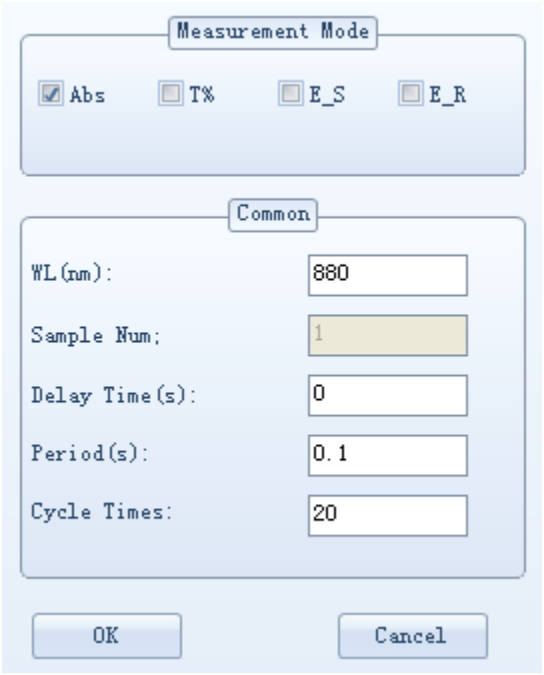
To create a new method, click **New** under the **File** menu. The **message** dialog box will be displayed querying whether to save the current kinetic method as shown in the figure below; click **Yes** to save the method in the specified directory and restore the method parameters to their default values; click **No** to abandon the current kinetic method and restore the method parameters to their default values automatically.



Tip:

- You can also set or modify the method parameters directly without clicking **New**.
- If no method parameter is set, the default method parameters will be used during the measurement.

Set the Method Parameters



Measurement Mode

The kinetic measurement supports four measurement modes (**Abs** (absorbance), **T%** (transmittance), **E_S** (sample energy) and **E_R** (reference energy)). When integrating sphere is used, the **R%** (reflectance) mode is also available. Wherein, **E_S** and **E_R** modes can be selected at the same time.

Abs

Measure the sample's absorption degree of the light (the absorption of different sample of the light is different).

T%

Measure the absorption of the material of the light. The calculation formula is as follows.

Abs=-log T=-log (Es/Er)

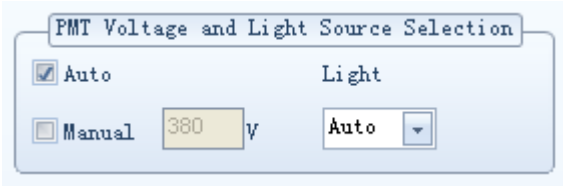
Wherein, **Es** represents the sample energy and **Er** represents the reference energy.

Note:

- The calculated absorbance should be the same with that displayed at the bottom of the interface.
- When the sample cell is hollow, the transmittance measured should be between 100.3% and 99.7% (specification: ±0.3%T).

E_S or E_R

Energy mode (sample energy or reference energy). After selecting this method, the **PMT Voltage and Light Source Selection** dialog box will be displayed at the right side and you need to set the PMT voltage and select the light source.



PMT Voltage and Light Source Selection:

Auto

When it is selected, the instrument will select voltage for the PMT automatically.

Manual

When it is selected, you need to set the PMT voltage manually. The range is from 0V to 1000V and the default is 380V.

Light

Select the PMT light source. It can be set to D2 (deuterium lamp), W (tungsten lamp), OFF (do not use light source) and Auto.

Tip:

- The PMT working voltage is related to the PMT gain. The service life of the PMT will be affected when it works under high working voltage for long periods of time and high working voltage can only be used when the energy measured is less than a certain degree.
- You are recommended to use auto light source. In auto mode, the system will select light source automatically according to the wavelength set.

Common

Set the method parameters including:

WL (nm)

Set the wavelength point of kinetic measurement. It can be set to any integer from 190nm to 900nm and the default is 880nm. In kinetic measurement, the system samples data at this wavelength point continuously.

Sample Num

Set the number of samples for each measurement. When **single cell** is used, the sample number is 1 by default and the input box is not available; when **8-series multicell** is used, you can set the sample number and the range is from 1 to 8.

Delay Time (s)

Set the time that the system waits before running the measurement. The range is from 0s to 24h (integer) and the unit is s (second). When the input exceeds this range or contains characters rather than numbers, prompt message will be displayed.

Period (s)

The time needed for a complete sample. The unit is s. The range of the period is related to the option used and the number of samples to be measured.
When **single cell** is used, the period range is from 0.1s to 500.0s (with accuracy of one decimal place);
When **8-series multicell** is used, the period range is from 15.0s to 1000.0s (with accuracy of one decimal place).

Cycle Times

The number of sample points. It can be set to any integer from 0 to 15000.

Click **OK** when the method setup is finished and the software will directly enter the acquisition interface without saving the related settings; click **Cancel** and the method parameters will be restored to their default values. You can also click **Save** in the **Method** option under the **File** menu to save the new method to the default directory, or click **Save As** to save the new method to the specified directory using the specified name.

Tip:

- The measurement acquisition time does not contain the delay time and are calculated from the start of the measurement.
- If the period set is too short or the number of samples is too large, some of the samples might not be measured or the measurement accuracy might be affected.
- If you want to use the method already exists instead of creating a new method, click **Open** in the **Method** option under the **File** menu to directly load the method already saved.

4.2.3 To Send the Kinetic Measurement Method

After setting the sample parameters, click **Send Method** under the **Acquisition** menu, **UltraUV** sends the method parameters to the instrument and the instrument receives and records the method parameters set.

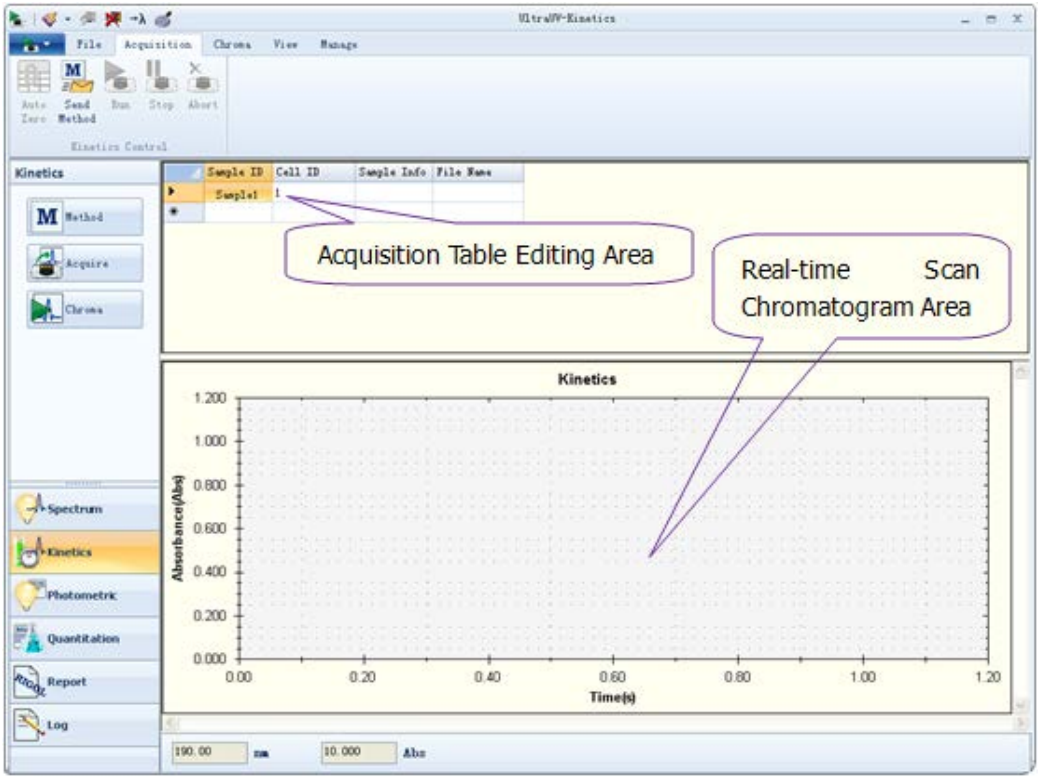
Tip:

- You need to send the method again if the method parameters are changed after sending the method; otherwise, the system will make measurement according to the previous method.

4.2.4 To Edit the Acquisition Table of Kinetic Measurement

Click 

at the left of the kinetic measurement interface or click **OK** after setting the method parameters of the kinetic measurement to enter the acquisition interface. The acquisition interface consists of the **Acquisition Table Editing Area** and the **Real-time Scan Chromatogram Area** which are used to edit the related parameters of the acquisition table and display the measured chromatogram respectively as shown in the figure below.



Acquisition Table Editing Area

Edit the acquisition table. If not, the auto zero and measurement can not be performed.

Sample ID

Set the name of the sample. If you do not set the sample ID, the default value will be used ("Sample" plus the line number, for example, Sample1). If single cell is used, you can only set one sample; if 8-series multicell is used, up to 8 samples can be edited.

Tip:

- After setting the sample ID, press **Enter** on the keyboard to change to the next sample ID; press **Tab** to directly switch to the cell ID input box (and so on); press the direction keys on the keyboard to make corresponding switches.

Cell ID

Select the cell number. The cell number can not be input manually and you need to select the cell number from the dropdown arrow in the input box. If single cell is used, the cell ID can only be set to 1; if 8-series multicell is used, it can be set to 1 to 8.

Sample Info

Input the remark (explanatory description) of the sample, for example, the sample submitter, date of sample submitted, sample name, dilutability, standard sample or not and concentration.

File Name

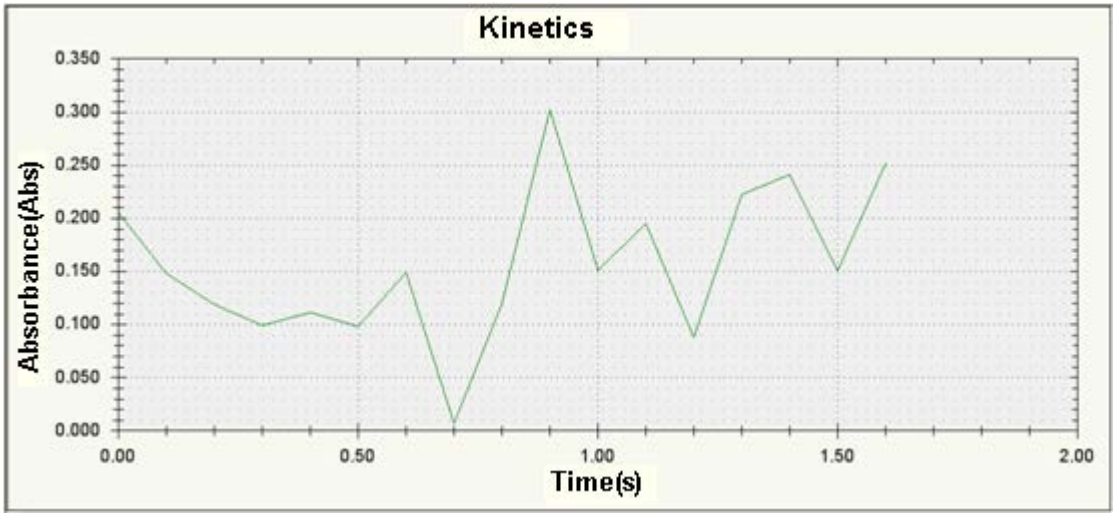
The name of the data file storing the measurement result after the measurement. If no data file name is specified, the measurement result will be stored in “Sample1Year-Month-Date-Hour-Minute-Second” format automatically.

Note:

- You need to edit the acquisition table before executing kinetic measurement.
- In kinetic measurement, up to 8 samples can be measured at the same time and you will not be informed to change the sample during the measurement.
- The data file name conforms to the Windows standard naming rules. Its length can not exceed 256 characters and the filename can be English letters, numbers, ￥@＆＋（）, underscore, space and Chinese characters, but "**：？\ * | < > : /**" can not be used.

Real-time Scan Chromatogram Area

The sample data changes accordingly during the measurement and the result acquired is displayed in this area in figure form accordingly.



4.2.5 To Execute the Auto Zero of Kinetic Measurement

In **auto zero**, the system samples at a certain sample rate and averages the points sampled during specified period. This average value is taken as the zero value which needs to be subtracted from all the measurement values.

After setting the sample parameters, click 

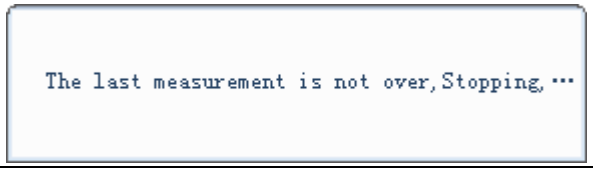
under the **Acquisition** menu and the instrument performs auto zero. The dialog box as shown in the figure below will be displayed after the auto zero is finished.

Note:

- Auto zero must be performed to adjust the output to zero before each kinetic measurement; otherwise, the measurement accuracy might be affected.
- Other operations are unavailable during auto zero.

Tip:

- When the measurement mode is **E_S** or **E_R**, the sample energy or reference energy will not be affected by auto zero.
- If the software is closed or the instrument is disconnected during auto zero, the dialog box as shown in the figure below will be displayed at the next start-up of the software and connection of the instrument.



4.2.6 To Run Kinetic Measurement

After auto zero is finished, click **Run** under the **Acquisition** menu, the instrument makes measurement according to the parameters set and the measured data is displayed at the lower part of the interface in curve form.
After the measurement is finished, **UltraUV** switches to the chromatogram interface automatically. The measurement result is displayed at the right side of the interface in chromatogram form. You can also click **Run** to perform measurement again using the current settings. At the same time, the current wavelength and absorbance are displayed in the status bar in the main interface.

Note:

- This function is only available after sending the method.
- You can click **Stop** or **Abort** to stop the measurement during the measurement.
- Do not close the software or turn off the instrument during the measurement, otherwise, the measurement result will be lost and abnormal prompt message will be displayed at the next start-up of the software.

4.2.7 To Stop Kinetic Measurement

Click **Stop** or **Abort** under the **Acquisition** menu to stop the current measurement. The measurement stopped can not be resumed and you need to send the method again and restart the measurement.

The difference between Stop and Abort

Stop

The instrument stops the measurement and saves the measurement data. The software switches to the chromatogram interface and you can process the data measured.

Abort

The instrument stops the measurement without saving the measurement data and you need to send the method again and run the measurement.

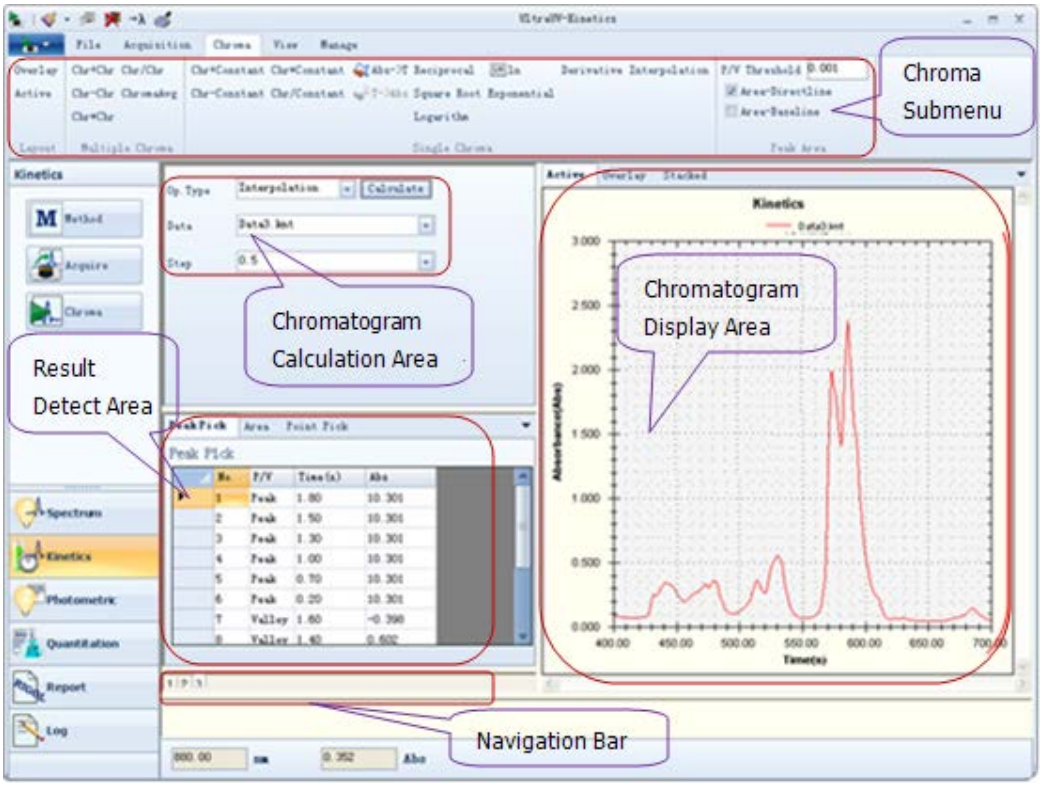
Note:

- The **Stop** or **Abort** operation is only available after sending the method and starting the measurement.

4.2.8 Chromatogram Processing of Kinetic Measurement

After the kinetic measurement finishes, the measurement results are saved in the default storage directory of the system and **UltraUV** switches to the 

interface automatically as shown in the figure below. You can process the chromatogram measured and save the results. Besides, you can also process the scan chromatogram saved (operation method: click **Open** in the **Chroma** option under the **File** menu to select the chromatogram to be processed).



Tip:

- If no chromatogram is currently opened, chromatogram processing can not be performed. The chromatograms currently opened will be numbered and displayed in the **Navigation Bar** according to the order in which they are opened. You can click the numbers to switch among the chromatograms and at most, 16 curves can be displayed at the same time.

The processing method of kinetic measurement is similar to that of spectrum measurement. For details, refer to "Chromatogram Processing of Spectrum Measurement".

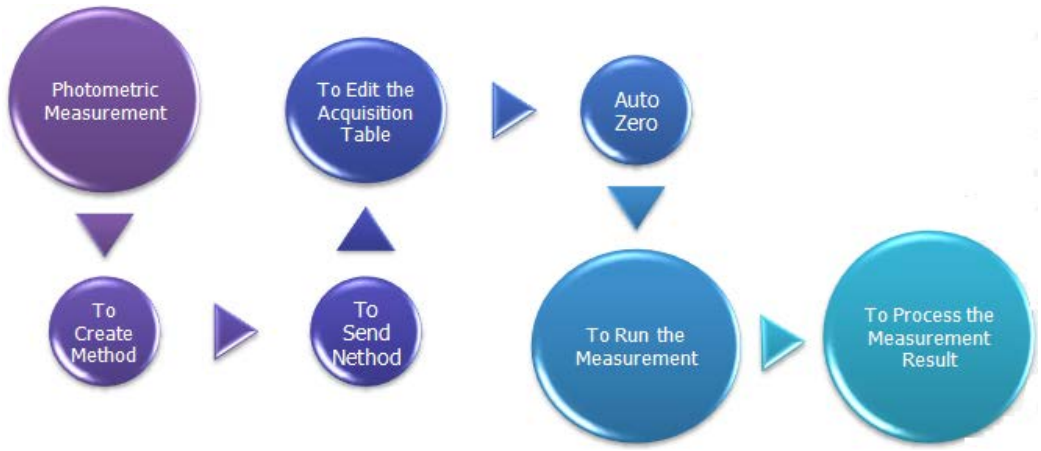
4.3 Photometric Measurement

In **photometric measurement**, the system measures the absorbance and transmittance of the sample at the specified wavelength and the measurement result is the absorbance (transmittance or energy) of the sample at the specified wavelength. You can specify multiple wavelength points (at most 10) for photometric measurement and can perform simple math operations on the data measured.

 **Main topics:**

4.3.1 Photometric Measurement Procedures

The photometric measurement procedures of **UltraUV** are as follows.



4.3.2 To Create Photometric Measurement Method

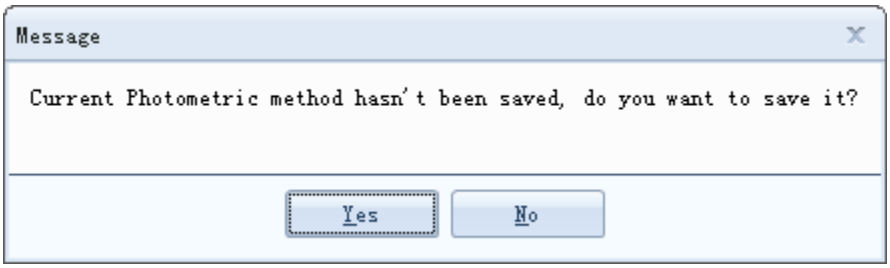
Set the method parameters before performing photometric measurement. Click 

to activate the photometric measurement window and by default, the software switches to the method setting interface of **photometric measurement**. You can create a new method or use the method already exists through this interface.

Create Method

To create a new method, click **New** under the **File** menu. The **message** dialog box will be displayed querying whether to save the current photometric method as shown in the figure below; click **Yes** to save the method in the specified directory and restore the method parameters to their default values; click **No** to abandon the

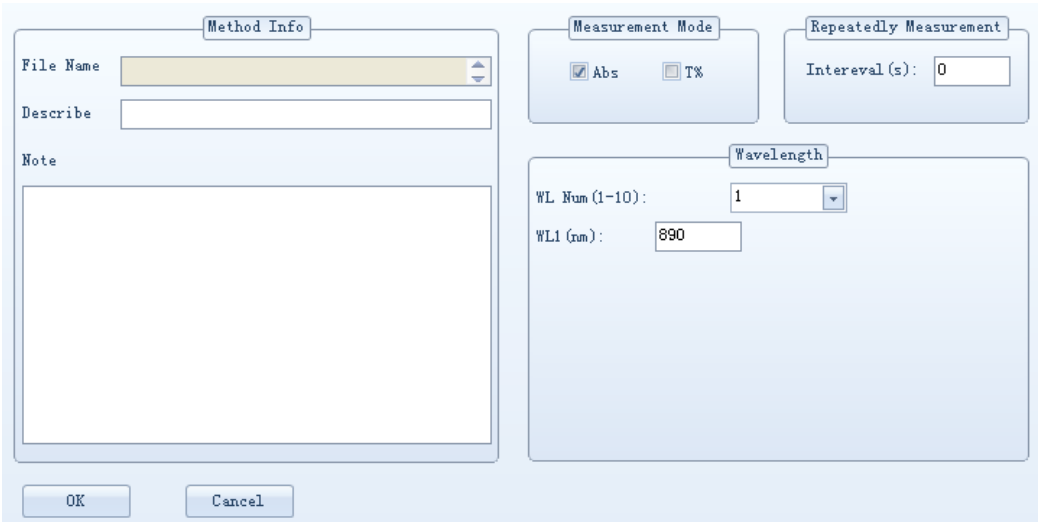
current photometric method and restore the method parameters to their default values automatically.



Tip:

- You can also set or modify the method parameters directly without clicking **New**.
- If no method parameter is set, the default method parameters will be used during the measurement.

Set the Method Parameters



Method Info

File Name

Display the storage directory and filename of the method created.

Describe

Describe the method created.

Note

Add explanation (such as the measurement settings and sample information) of the method edited.

Measurement Mode

The kinetic measurement supports two measurement modes (**Abs** (absorbance) and **T%** (transmittance)). When integrating sphere is used, the **R%** (reflectance) mode is also available.

Abs

Measure the sample's absorption degree of the light (the absorption of different sample of the light is different).

T%

Measure the absorption of the material of the light. The calculation formula is as follows.

Abs=-log T=-log (Es/Er)

Wherein, **Es** represents the sample energy and **Er** represents the reference energy.

Note:

- The calculated absorbance should be the same with that displayed at the bottom of the interface.
- When the sample cell is hollow, the transmittance measured should be between 100.3% and 99.7% (specification: ±0.3%T).
- The two measurement modes can not be selected at the same time.

Repeatedly Measurement

In photometric measurement, you can make repeated measurements on the same sample.

Interval (s)

Set the time interval between measurements when performing repeated measurements on the sample. The range is from 0 to 86400s (integer). When the time interval is 0, the system will measure continuously.

Wavelength

WL Num (1-10)

Set the number of wavelength points for measurement and up to 10 wavelengths can be set.

WLn (nm)

Set the wavelength to be measured. The corresponding number of wavelength setting boxes of the wavelength points to be measured will be displayed. The range of the wavelength is from 190nm to 900nm.

Click **OK** when the method setup is finished and the software will directly enter the acquisition interface without saving the related settings; click **Cancel** and the method parameters will be restored to their default values. You can also click **Save** in the **Method** option under the **File** menu to save the new method to the default directory, or click **Save As** to save the new method to the specified directory using the specified name.

Tip:

- If you want to use the method already exists instead of creating a new method, click **Open** in the **Method** option under the **File** menu to directly load the method already saved.

4.3.3 To Send the Photometric Measurement Method

After setting the sample parameters, click **Send Method** under the **Acquisition** menu, **UltraUV** sends the method parameters to the instrument and the instrument receives and records the method parameters set.

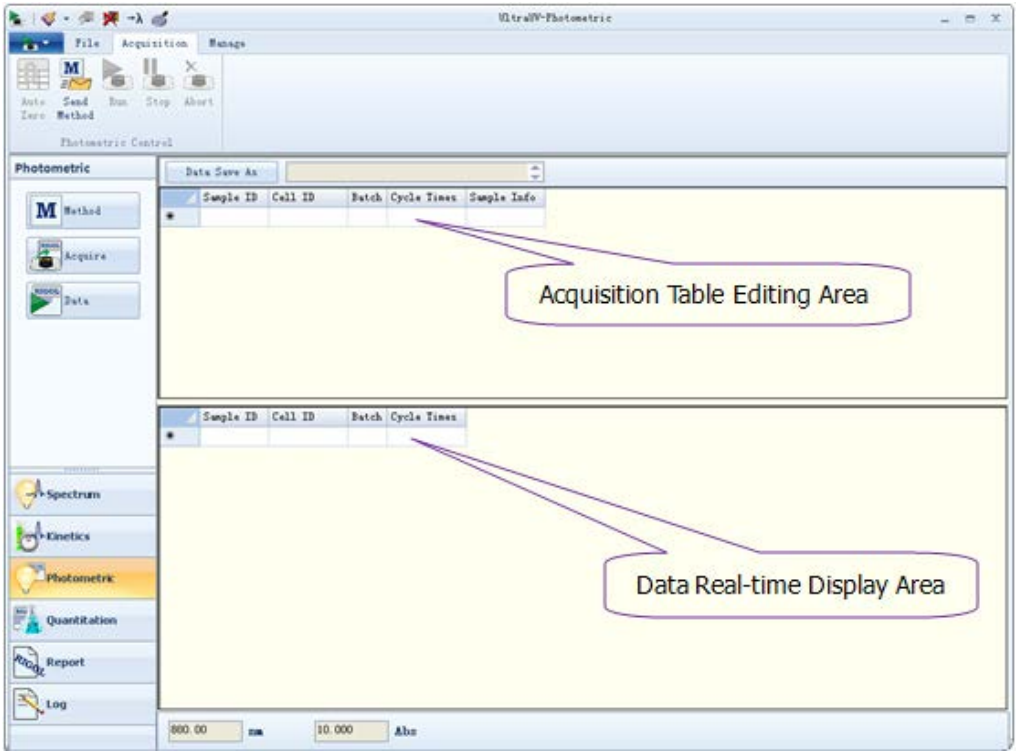
Tip:

- You need to send the method again if the method parameters are changed after sending the method; otherwise, the system will make measurement according to the previous method.

4.3.4 To Edit the Acquisition Table of Photometric Measurement

Click 

at the left of the photometric measurement interface or click **OK** after setting the method parameters of the photometric measurement to enter the acquisition interface. The acquisition interface consists of the **Acquisition Table Editing Area** and the **Data Real-time Display Area** which are used to edit the related parameters of the sample and display the measured data respectively as shown in the figure below.



Acquisition Table Editing Area

Edit the acquisition table. If not, the auto zero and measurement can not be performed.

Sample ID

Set the name of the sample. If you do not set the sample ID, the default value will be used ("Sample" plus the line number, for example, Sample1).

Cell ID

Select the cell number. The cell number can not be input manually and you need to select the cell number from the dropdown arrow in the input box. If single cell is used, the cell ID can only be set to 1; if 8-series multicell is used, it can be set to 1 to 8.

Batch

In photometric measurement, you can measure the samples in multiple cells in the same measurement, therefore, batch measurement is required. The batch of the sample is determined by the cell ID (the batch increments automatically when the

cell ID is edited) and you can not edit it. The batch range is from 1 to 20.

Cycle Times

Set the number of measurements performed on the sample at a certain wavelength and at most 100 measurements can be performed. If the cycle times input exceeds this range, it will be automatically modified to 100 and the message dialog box will be displayed. After the measurement is finished, the result of each measurement will be displayed in table form in order.

Sample Info

Input the remark (explanatory description) of the sample, for example, the sample submitter, date of sample submitted, sample name, dilutability, standard sample or not and concentration.

Data Save As

After the measurement is finished, click **Data Save As** above the sample setting area to store the parameters set in the specified directory with the specified filename.

Note:

- You need to edit the acquisition table before executing photometric measurement.
- The data file name conforms to the Windows standard naming rules. Its length can not exceed 256 characters and the filename can be English letters, numbers, ￥@＆＋（）, underscore, space and Chinese characters, but "**：？ \ * | < > : /**" can not be used.

Tip:

- After setting the sample ID, press **Enter** on the keyboard to change to the next sample ID; press **Tab** to directly switch to the cell ID input box (and so on); press the direction keys on the keyboard to make corresponding switches. If single cell is used, you can only set one sample; if 8-series multicell is used, up to 8 samples can be edited.
- For scanning of the same sample, you only need to set the cycle times rather than setting the measurement method again.

Data Real-time Display Area

During the measurement, the data measured will be displayed in this area in table form.

	Sample ID	Cell ID	Batch	Cycle Times	890nm	880nm	870nm
▶	Sample1	1	1	1	0.001	-0.002	-0.001
	Sample1	1	1	2	0.001	-0.002	-0.001
	Sample1	1	1	3	0.001	-0.002	-0.002
	Sample2	2	1	1	0.004	0.007	
	Sample2	2	1	2	0.004	0.007	
	Sample2	2	1	3	0.004	0.006	
	Sample3	3	1	1	0.003	0.005	
	Sample3	3	1	2	0.001	0.007	
	Sample3	3	1	3	0.004	0.007	
*							

4.3.5 To Execute the Auto Zero of Photometric Measurement

In **auto zero**, the background within the wavelength range currently selected is set to zero and all the readings within this range will be affected. Auto zero ensures a better reference point for data acquisition.

After setting the sample parameters, click 

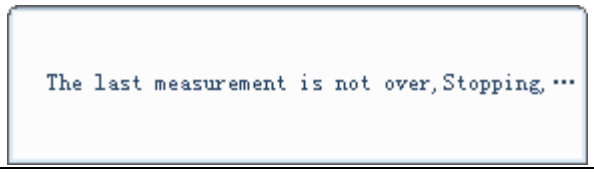
under the **Acquisition** menu and the instrument performs auto zero. The dialog box as shown in the figure on the next page will be displayed after the auto zero is finished.

Note:

- Auto zero must be performed to adjust the output to zero before each photometric measurement; otherwise, the measurement accuracy might be affected.
- Other operations are unavailable during auto zero.

Tip:

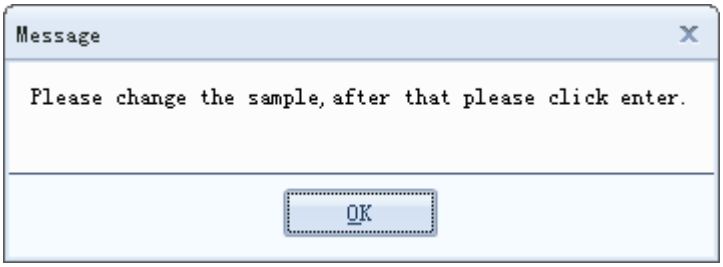
- If the software is closed or the instrument is disconnected during auto zero, the dialog box as shown in the figure below will be displayed at the next start-up of the software and connection of the instrument.



4.3.6 To Run Photometric Measurement

After auto zero is finished, click **Run** under the **Acquisition** menu, the instrument makes measurement according to the parameters set and the measured data is displayed at the **Data Real-time Display Area** in table form.

When multiple samples are measured, the dialog box as shown in the figure below will be displayed to inform you to change the sample after the measurement of the current sample is finished.



After the measurement is finished, the dialog box informing you that the

measurement is finished will be displayed; click **OK** and the instrument will switch to the data processing interface automatically. The measurement results will be displayed at the right side of the interface in table form.

Note:

- If you do not change the sample and click **OK** directly, the instrument will continue to measure the previous sample and the measurement results will be affected.
- Do not close the software or turn off the instrument during the measurement; otherwise, the measurement results will be lost and abnormal prompt message will be displayed at the next start-up of the software.

Tip:

- This function is only available after sending the method.
- You can click **Stop** or **Abort** to stop the measurement during the measurement.

4.3.7 To Stop Photometric Measurement

Click **Stop** or **Abort** under the **Acquisition** menu to stop the current measurement.

The difference between Stop and Abort

Stop

The instrument stops the measurement and saves the measurement data. The software switches to the data processing interface and you can view the photometric data measured. If the measurement table is complete, you can also process the photometric data.

Abort

The instrument stops the measurement without saving the measurement data. You need the send the method and run the measurement again.

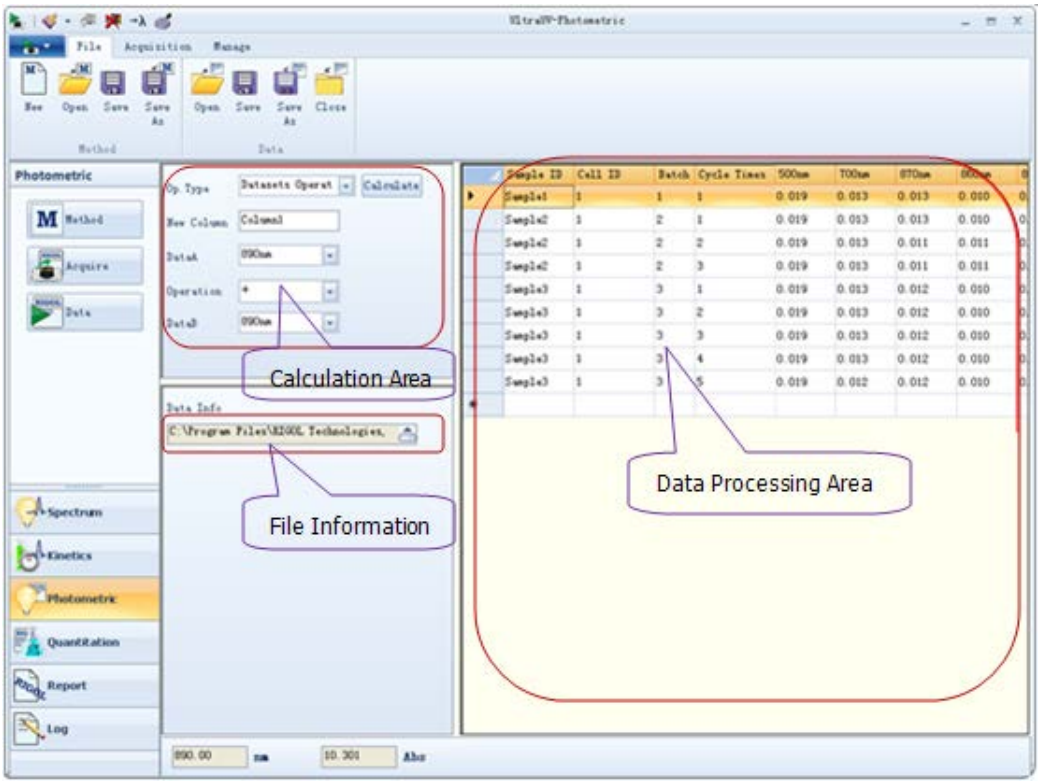
Note:

- The **Stop** or **Abort** operation is only available after sending the method and starting the measurement.
- If you stop the photometric measurement during the measurement process, this measurement can not be resumed and you need to run the measurement again.

4.3.8 Data Processing of Photometric Measurement

When the photometric measurement is finished, the data measured will be stored in the default storage directory of the system and **UltraUV** will switch to the 

interface automatically as show in the figure below. You can process the data measured and save the results (operation method: click **Save** in the **Data** option under the **File** menu to save the current data processing result in the default directory; or click **Save As** to save the result in the specified directory with the specified name). Besides, you can also process the data already saved (operation method: click **Open** in the **Data** option under the **File** menu to select the desired data file).



This part is mainly used to perform various operations on the data measured and the results are displayed in the **Data Processing Area** accordingly. Photometric measurement supports the following operations.

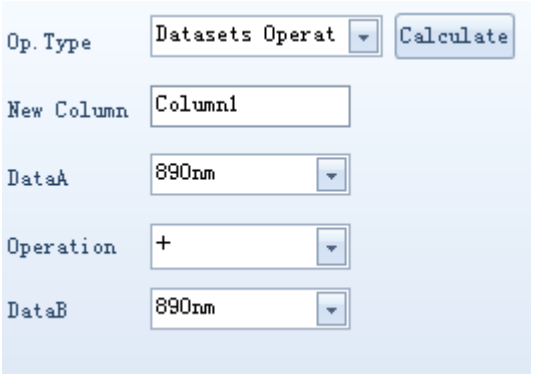
- **Datasets Operation**
- **Arithmetic**
- **Transform**
- **Ensemble Average**
- **RSD**
- **Custom**

Data Info

Display the storage directory and filename of the data file currently processed.

4.3.8.1 Datasets Operation

Perform datasets operation on the photometric data measured. You need to set the related parameters after datasets operation is selected as shown in the figure below.



New Column

Set the name of the column of the operation result. If no column name is set, the column name is the “Column plus the column number" by default, such as Column1.

DataA

Select the name of the column for the datasets operation from the dropdown list.

Operation

Select the operator from the dropdown list and the operators include "+, - , *, /".

DataB

Select the name of the column for the datasets operation from the dropdown list.

Calculate

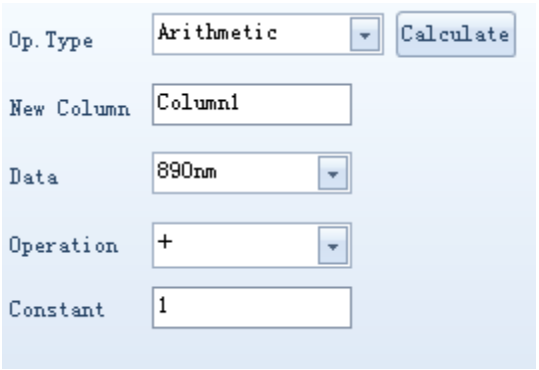
Click this button and the software calculates according to the setting automatically. The operation result will be displayed in the **Data Processing Area** in a new column (next to the last column of the measurement data table).

Tip:

- To make the operation, **DataA** and **DataB** must be selected.
- Click **Close** in the **Data** option under the **File** menu to close the data file currently processed.

4.3.8.2 Arithmetic

Perform arithmetic operation on the data measured and constant. You need to set the related parameters when arithmetic operation is selected as shown in the figure below.



New Column

Set the name of the column of the operation result. If no column name is set, the column name is the “Column plus the column number" by default, such as Column1.

Data

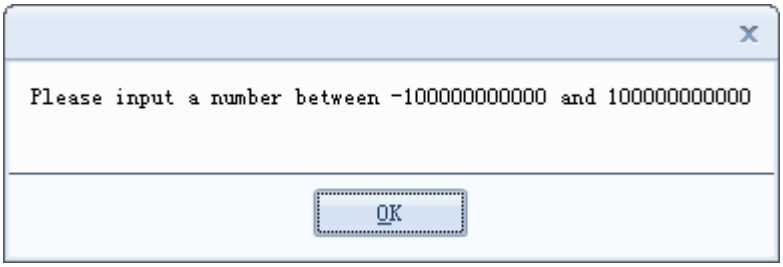
Select the name of the column for the arithmetic operation.

Operation

Select the operator from the dropdown list and the operators include "+, - , *, /".

Constant

Set the constant and it can be any integer from -100,000,000,000 to 100,000,000,000. If the constant input exceeds this range, the prompt message as shown in the figure on the next page will be displayed after clicking **Calculate**.

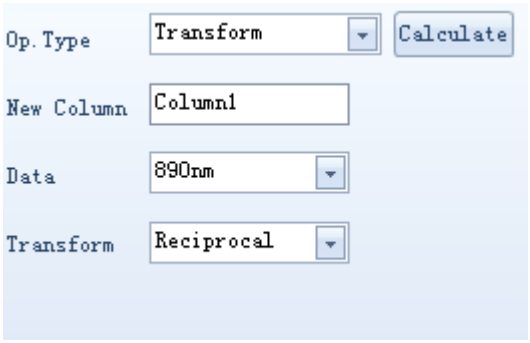


Calculate

Click this button and the software calculates according to the setting automatically. The operation result will be displayed in the **Data Processing Area** in a new column (next to the last column of the measurement data table).

4.3.8.3 Transform

Perform measurement mode transform and save the result as a new file. You need to set the related parameters when transform is selected as shown in the figure below.



New Column

Set the name of the column of the operation result. If no column name is set, the column name is the “Column plus the column number" by default, such as Column1.

Data

Select the name of the column for the transform operation.

Transform

Select the transform type (include Logarithm, Reciprocal, T->Abs (or Abs->T), Pow, Square Root, ln and Exponential).

Calculate

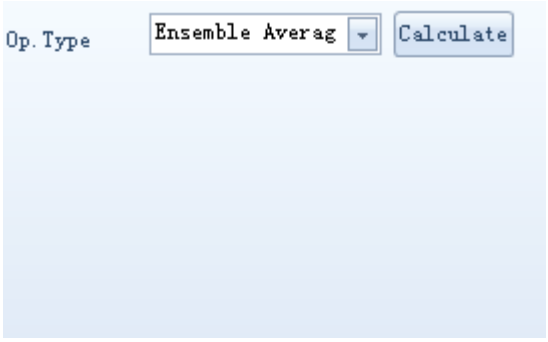
Click this button and the software calculates according to the setting automatically. The operation result will be displayed in the **Data Processing Area** in a new column (next to the last column of the measurement data table).

Tip:

- The name of the new column will appear in the **Data** dropdown list after the operation.
- If you click **Calculate** again after the operation is finished, the previous operation result will not be overwritten or cleared and the current operation result will be displayed in a new column (next to the last column of the table), and so on.
- When the measurement mode is **Abs**, **T->Abs** transform is not available; when the measurement mode is **T%**, **Abs->T** transform is not available.

4.3.8.4 Ensemble Average

Calculate the average of the measurement values of multiple measurements of the same sample in the measurement result table.

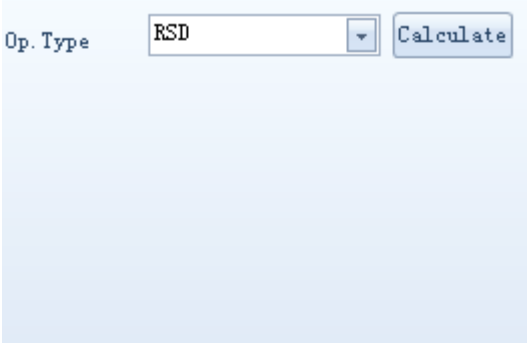


To calculate the average of the measurement results of multiple measurements of the same sample in the same batch and the same sample cell, click **Calculate**. The operation result will be displayed in the next line of the last measurement of each batch as shown in the figure on the next page.

	Sample ID	Cell ID	Batch	Cycle Times	890nm	880nm	870nm
▶	Sample1	1	1	1	0.002	-0.001	-0.001
	Sample1	1	1	2	0.002	-0.001	-0.001
	Sample1	1	1	3	0.002	-0.001	0.000
	Sample1	1	1	Aver	0.002	-0.001	-0.001
	Sample2	2	1	1	0.009	0.006	0.015
	Sample2	2	1	2	0.008	0.004	0.013
	Sample2	2	1	3	0.011	0.005	0.015
	Sample2	2	1	Aver	0.009	0.005	0.014
	Sample3	3	1	1	0.009	0.012	1.971
	Sample3	3	1	2	0.014	0.009	1.971
	Sample3	3	1	3	0.010	0.008	1.971
	Sample3	3	1	Aver	0.011	0.010	1.971
*							

4.3.8.5 RSD

Calculate the relative standard deviation of the measurement results of multiple measurements of the same sample.

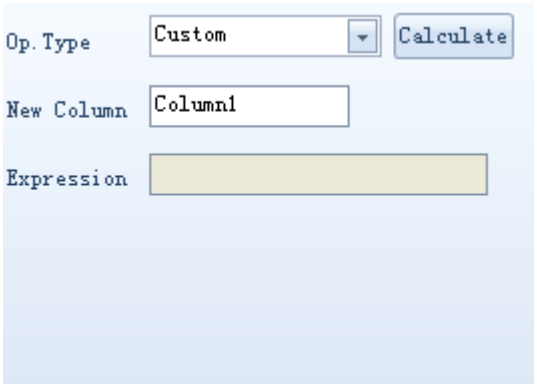


To calculate the relative standard deviation of the measurement results of multiple measurements of the same sample in the same batch and the same sample cell, click **Calculate**. The operation result will be displayed in the next line of the last measurement of each batch as shown in the figure on the next page.

	Sample ID	Cell ID	Batch	Cycle Times	890nm	880nm	870nm
▶	Sample1	1	1	1	0.002	-0.001	-0.001
	Sample1	1	1	2	0.002	-0.001	-0.001
	Sample1	1	1	3	0.002	-0.001	0.000
	Sample1	1	1	RSD	0.000	0.000	0.000
	Sample2	2	1	1	0.009	0.006	0.015
	Sample2	2	1	2	0.008	0.004	0.013
	Sample2	2	1	3	0.011	0.005	0.015
	Sample2	2	1	RSD	0.164	0.200	0.081
	Sample3	3	1	1	0.009	0.012	1.971
	Sample3	3	1	2	0.014	0.009	1.971
	Sample3	3	1	3	0.010	0.008	1.971
	Sample3	3	1	RSD	0.241	0.215	0.000
*							

4.3.8.6 Custom

You can also perform user-defined operation on the measurement results.

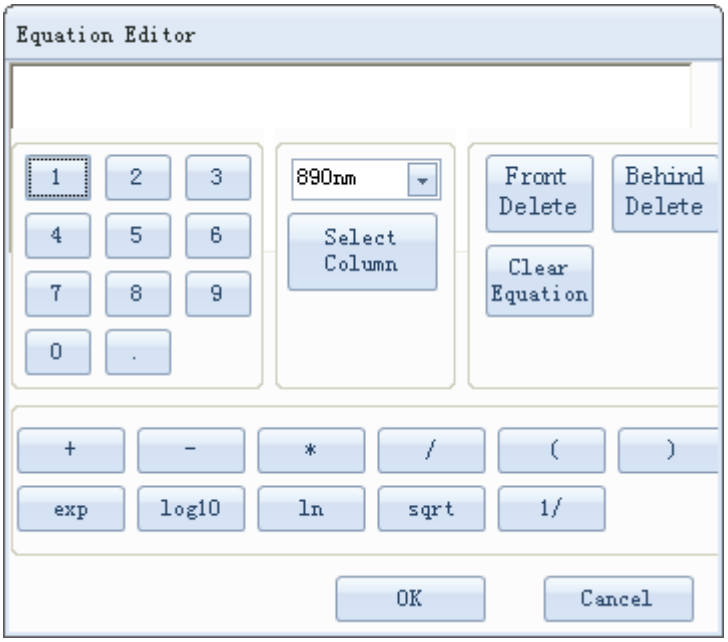


New Column

Set the name of the column of the operation result. If no column name is set, the column name is the “Column plus the column number" by default, such as Column1.

Expression

Define the desired operation expression. Click the **Expression** textbox and the **Equation Editor panel** as shown in the figure on the next page is displayed.



Select Column

Select the column for the operation in the dropdown list.

Front Delete

Delete the character at the left of the cursor.

Behind Delete

Delete the character at the right of the cursor.

Clear Equation

Delete all the characters.

OK

Apply the expression edited.

Cancel

Cancel this operation.

4.4 Quantitation Measurement

In **quantitation measurement**, the measurement value of the sample to be measured is compared to the standard curve to calculate the concentration of the sample to be measured, namely draw a absorbance-concentration relation curve according to the absorbance of the sample with known concentration, then measure the **Abs** value of the sample to be measured under the same conditions and calculate the concentration of the sample to be measured according to the Lambert-Beer law (the absorption of the material of the light is positively proportional to the concentration of the material) and the standard curve.

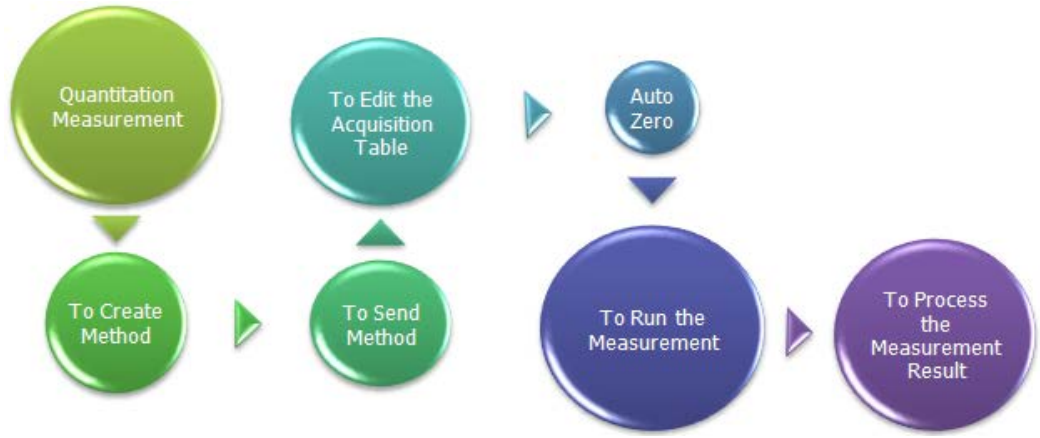
Quantitation measurement is mainly used to measure the concentration of the sample to be measured on the basis of the measurement result of the standard sample concentration.

Main topics:

- Quantitation Measurement Procedures
- To Create Quantitation Measurement Method
- To Send the Quantitation Measurement Method
- To Edit the Acquisition Table of Quantitation Measurement
- To Execute the Auto Zero of Quantitation Measurement
- To Run Quantitation Measurement
- To Stop Quantitation Measurement
- Data Processing of Quantitation Measurement

4.4.1 Quantitation Measurement Procedures

The procedures of quantitation measurement of **UltraUV** are as follows.



4.4.2 To Create Quantitation Measurement Method

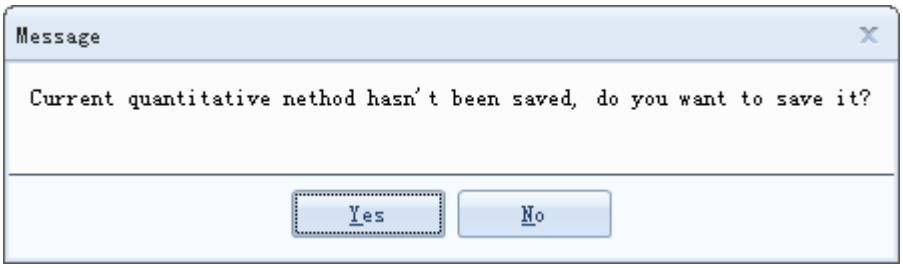
Set the method parameters before performing quantitation measurement. Click 

to activate the quantitation measurement interface and the software switches to the method setting interface of quantitation measurement by default. You can create a new method or use the method already exists through this interface.

Create Method

To create a new method, click **New** under the **File** menu. The **message** dialog box will be displayed querying whether to save the current quantitation method as shown in the figure below; click **Yes** to save the method in the specified directory and restore the method parameters to their default values; click **No** to abandon the

current kinetic method and restore the method parameters to their default values automatically.

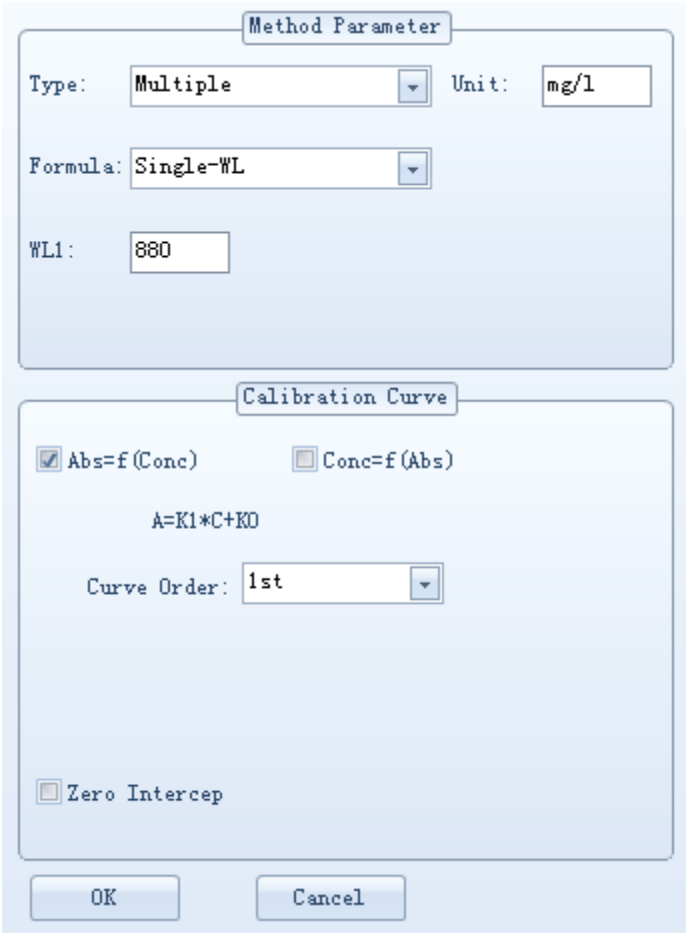


Tip:

- You can also set or modify the method parameters directly without clicking **New** when connecting the instrument for the first time.
- If no method parameter is set, the default method parameters will be used during the measurement.

Set the Method Parameters

Quantitation measurement supports multiple quantitation types. The method parameters and the calibration curve parameters to be set differ when different quantitation type is selected.



Method Parameter

Type

Click the type dropdown box to select the desired quantitation type including:

Single

Draw a standard curve between one point and the zero point.

Multiple

Draw a standard curve on the basis of multiple data points.

K-Factor

You can define the formula coefficient according to your need.

Logging Data

Input data manually to draw a standard curve.

Logging Standard Data

Only support *.std file.

Unit

Set the concentration unit of the sample and the default is mg/l. If the quantitation type selected is **Logging Standard Data**, the unit can not be set.

Formula

Select the operation formula of quantitation measurement. If the quantitation type selected is **Logging Standard Data**, the formula not be set. The formulas available include:

Single-WL

Scan the sample at the single wavelength point set (it can be any integer from 190nm to 900nm). When single wavelength is selected, you only need to set one wavelength point (**WL1**).

Dual-WL Factor

Measure the absorbance of the material. When dual wavelength factor is selected, you need to set two wavelength points (**WL1** and **WL2**; they can be set to any integer from 190nm to 900nm) and the **factor** (it can be set to any integer between -99999 to 999999).

Measurement Principle: eliminate the effects of the interfering component by calculating the difference of the absorbance under two wavelengths. Measure the absorbance (A_1) of the solvent under the wavelength **WL1**, then measure the absorbance (A_2) of the solvent under the wavelength **WL2**; multiply A_2 with a factor (user-defined) and subtract the result from A_1 to get the absorbance of the material.

Dual-WL

Measure the absorbance of the material. You need to set two wavelength points

(**WL1** and **WL2**; they can be any integer from 190nm to 900 nm) when dual wavelength mode is selected.

Measurement Principle: eliminate the effects of the interfering component by calculating the difference of the absorbance under two wavelengths. Measure the absorbance (A_1) of the solvent under the wavelength **WL1**, then measure the absorbance (A_2) of the solvent under the wavelength **WL2**; subtract A_2 from A_1 to get the absorbance of the material.

Three-WL

Measure the absorbance of the material. You need to set three wavelength points (**WL1**, **WL2** and **WL3**; they can be any integer from 190nm to 900nm). Compared to dual wavelength mode, three wavelength mode provides better sensitivity and accuracy.

Measurement Principle: when the absorption of interfering components occurs, select three wavelength points of the component under test that have linear absorption and calculate the content of the component using arithmetic operation.

Calibration Curve

The standard curve is used to calculate the concentration of the unknown sample. Draw an **Absorbance-Concentration** curve (called the standard curve) by measuring the absorbance of the sample with known concentration. You need to set the following parameters.

Conc=f (Abs)

Calculate the concentration by taking the absorbance as the variable, for example, A=K1*C+K0. Note: in **k-Factor**, this option is not available.

Abs=f (Conc)

Mainly used to calculate the absorption factor. This is the inverse function of the one above. For example, C=K1*A+K0. Note: in **k-Factor**, this option is not available.

Curve Order

Represent the order of the equation of the calibration curve and it can also be called exponent number. The curve orders available include:

1st

The standard curve is displayed as a first-order curve (also called linear equation). Note: in **Single** mode, the default curve order is **1st** and can not be modified.

2nd

The standard curve is displayed as a quadratic curve.

3rd

The standard curve is displayed as a cubic curve.

Zero Intercep

When it is checked, the standard curve passes the zero point. Note: this option is only available in **Multiple**, **Logging Data** and **Logging Standard Data**.

Click **OK** when the method setup is finished and the software will directly enter the acquisition interface without saving the related settings; click **Cancel** and the method parameters will be restored to their default values. You can also click **Save** in the **Method** option under the **File** menu to save the new method to the default directory, or click **Save As** to save the new method to the specified directory using the specified name.

Tip:

- After clicking **OK**, the method parameters can not be modified. To modify them, click **New** to create a new method.
- If you want to use the method already exists instead of creating a new method, click **Open** in the **Method** option under the **File** menu to directly load the method already saved

4.4.3 To Send the Quantitation Measurement Method

After setting the sample parameters, click **Send Method** under the **Acquisition** menu, **UltraUV** sends the method parameters to the instrument and the instrument receives and records the method parameters set.

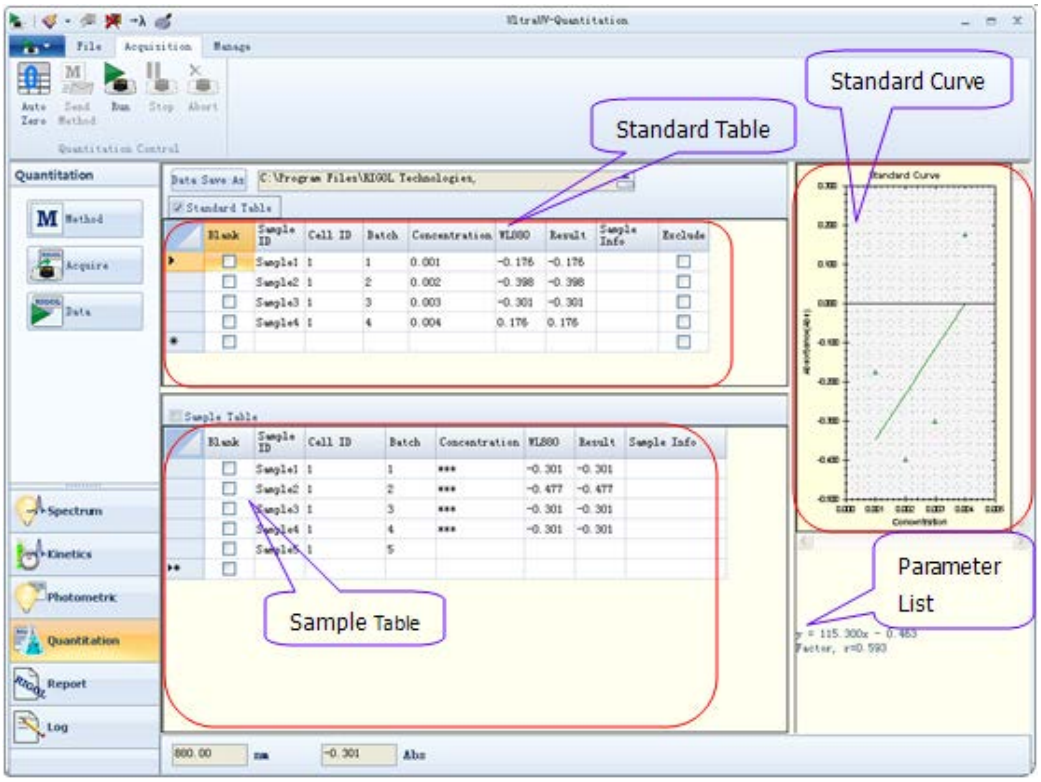
Tip:

- You need to send the method again if the method parameters are changed after sending the method; otherwise, the system will make measurement according to the previous method.

4.4.4 To Edit the Acquisition Table of Quantitation Measurement

Click 

at the left of the quantitation measurement interface or click **OK** after setting the method parameters of the quantitation measurement to enter the acquisition interface as shown in the figure below.



Data Save As

After the method is sent, the default storage directory and filename of the data will be displayed. You can also click **Data Save As** to store the data measured in the specified directory with the specified filename.

Note:

- ✘ The data file name conforms to the Windows standard naming rules. Its length can not exceed 256 characters and the filename can be English letters, numbers, ￥@＆＋（）, underscore, space and Chinese characters, but "**：？ \ * | < > : /**" can not be used.
- ✘ You need to edit the acquisition table before executing quantitation measurement.
- ✘ The standard table and sample table can not be activated or disabled at the same time. Auto zero and measurement can not be made if the sample table is not edited.

Standard Table

Edit the acquisition table of the standard sample table. The standard table is the data table obtained by sampling the material with known concentration under a single or multiple wavelengths. You can edit the parameters in the table after the standard table is activated.

Sample Table

Edit the acquisition table of the sample table. You can edit the parameters after the sample table is activated. The editing methods of the two tables are the same and in the following part, the standard table is taken as an example for illustration.

Blank

When it is check, the blank value will be subtracted from this point.

Sample ID

Set the name of the sample. If no sample ID is set, the default value (Sample plus line number, such as Sample1) will be used.

Cell ID

Select the cell number. The cell number can not be input manually and you need to select the cell number from the dropdown arrow in the input box. If single cell is used, the cell ID can only be set to 1; if 8-series multicell is used, it can be set to 1 to 8.

Batch

In quantitation measurement, you can measure the samples in multiple cells in the same measurement; therefore, batch measurement is required. The batch of the sample is determined by the cell ID (the batch increments automatically when the cell ID is edited) and you can not edit it. The batch range is from 1 to 20.

Concentration

Set the concentration of the sample. Auto zero and measurement can not be performed if the sample concentration is not set.

WLXXX (XXX represents the wavelength point)

Set the absorbance of the sample at the corresponding wavelength point (such as WL880).

Result

The final absorbance of the sample. The calculation formula is as follows.

Single	$\mathrm{Abs} = \mathrm{A}_1$
Dual-WL	$\mathrm{Abs} = \mathrm{A}_1 - \mathrm{A}_2$
Dual-WL Factor	$\mathrm{Abs} = \mathrm{A}_1 - \mathrm{A}_2 \bullet K$
Three-WL	$\mathrm{Abs} = \mathrm{A}_2 - [(\mathrm{W}_2 - \mathrm{W}_3) \times \mathrm{A}_1 + (\mathrm{W}_1 - \mathrm{W}_2) \times \mathrm{A}_3] \div (\mathrm{W}_1 - \mathrm{W}_3)$

Wherein, **Abs** is the final absorbance; $\mathbf{W_1}$ is wavelength1; $\mathbf{W_2}$ is wavelength2; $\mathbf{W_3}$ is wavelength3; $\mathbf{A_1}$ is the absorbance of wavelength1; $\mathbf{A_2}$ is the absorbance of wavelength2; $\mathbf{A_3}$ is the absorbance of wavelength3; **K** is the factor in Dual-WL Factor.

Sample Info

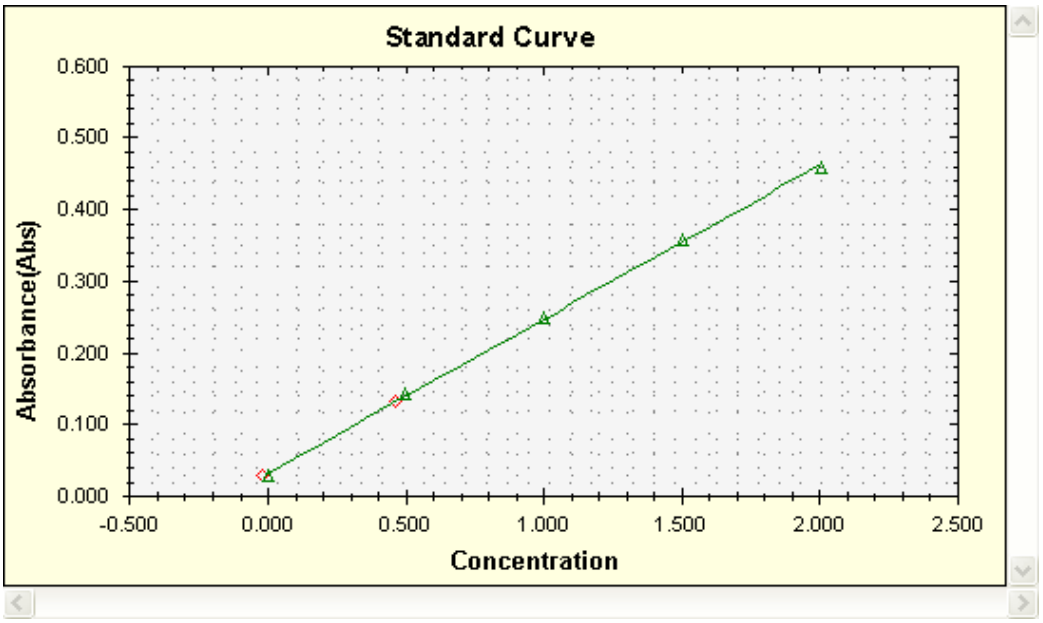
Input the remark (explanatory description) of the sample, for example, the sample submitter, date of sample submitted, sample name, dilutability, standard sample or not and concentration.

Exclude

When it is checked, this point will not be included in the curve. Note: this option is only available in the **Standard Table** after the data measurement is finished.

Standard Curve

During the measurement, the acquisition data changes accordingly. During the acquisition, the data points measured will be displayed on the corresponding coordinate points (marked by green triangle points). The corresponding standard curve is drawn according to the curve order set after the measurement is finished.



Tip:

- When measuring the sample, the data points measured will be displayed on the corresponding coordinate points (marked by red rhombic points) during the acquisition as shown in the figure above.

Parameter List

Display the current curve coefficient and the related coefficient.

4.4.5 To Execute the Auto Zero of Quantitation Measurement

In **Auto Zero**, the system samples at a certain sample rate and averages the points acquired during specified period. This average is taken as the aero value and will be subtracted from all the measurement values.

After setting the sample parameters, click 

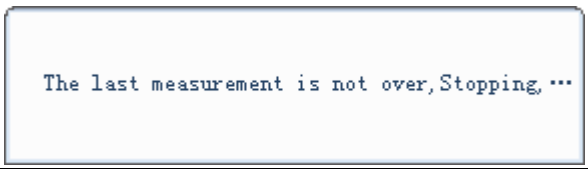
under the **Acquisition** menu and the instrument performs auto zero. The dialog box as shown in the figure on the next page will be displayed after the auto zero is finished.

Note:

- Auto zero must be performed to adjust the output to zero before each quantitation measurement; otherwise, the measurement accuracy might be affected.
- Other operations are unavailable during auto zero.

Tip:

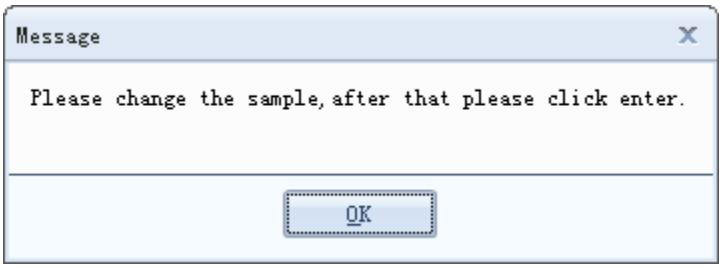
- If the software is closed or the instrument is disconnected during auto zero, the dialog box as shown in the figure below will be displayed at the next start-up of the software and connection of the instrument.



4.4.6 To Run Quantitation Measurement

After auto zero is finished, click **Run** under the **Acquisition** menu, the instrument makes measurement according to the parameters set and the measured data is displayed in the table.

When multiple samples are measured, the dialog box as shown in the figure below will be displayed to inform you to change the sample after the measurement of the current sample is finished.



After the measurement is finished, the dialog box informing you that the measurement is finished will be displayed; click **OK** to finish the measurement. If you want to make repeated measurement of the current setting, click **Run**. At the same time, the current wavelength and absorbance are displayed in the status bar in the main interface.

Note:

- If you do not change the sample and click **OK** directly, the instrument will continue to measure the previous sample and the measurement results will be affected.
- Do not close the software or turn off the instrument during the measurement; otherwise, the measurement results will be lost and abnormal prompt message will be displayed at the next start-up of the software.

Tip:

- This function is only available after sending the method.
- You can click **Stop** or **Abort** to stop the measurement during the measurement.

4.4.7 To Stop Quantitation Measurement

Click **Stop** or **Abort** under the **Acquisition** menu to stop the current measurement.

The difference between Stop and Abort

Stop

The instrument stops the measurement and saves the measurement data. You can click **Run** to resume the measurement without performing the auto zero again.

Abort

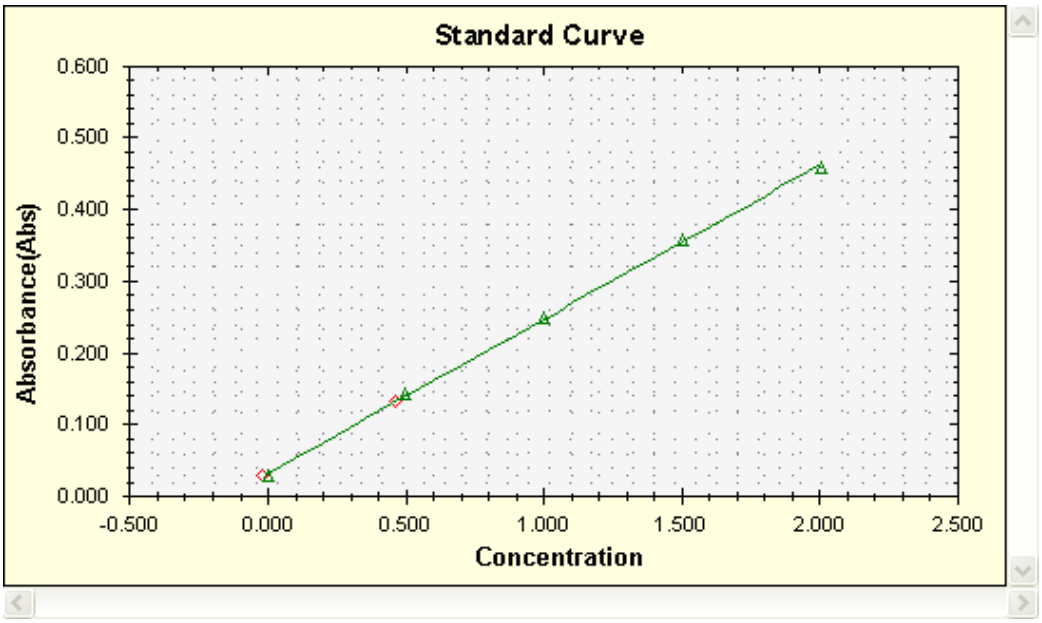
The instrument stops the measurement without saving the measurement data. You can click **Run** to run the measurement again.

Note:

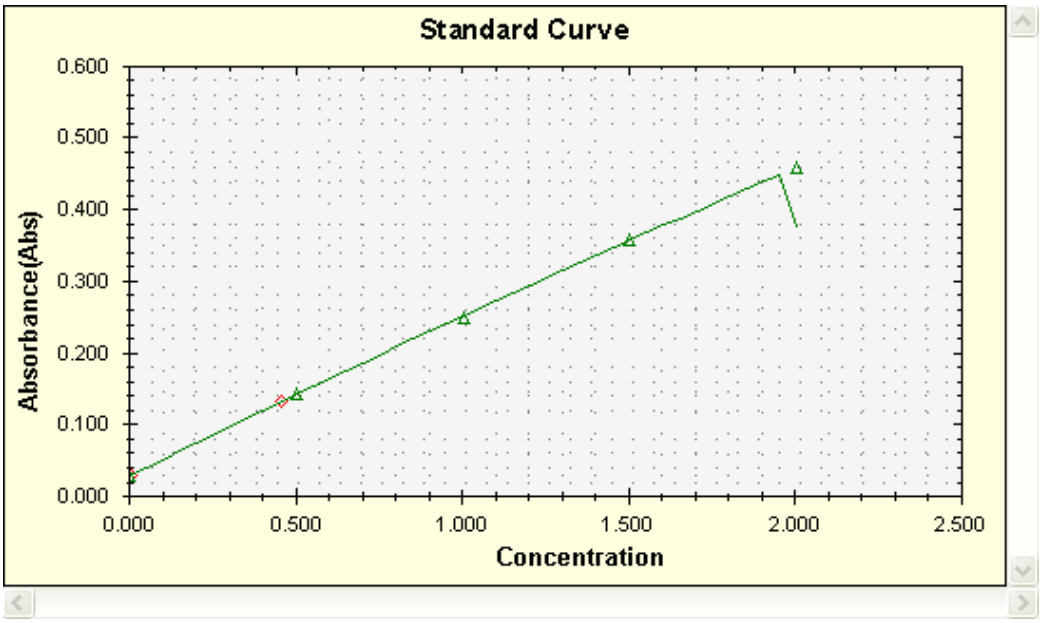
- The **Stop** or **Abort** operation is only available after sending the method and starting the measurement.

4.4.8 Data Processing of Quantitation Measurement

When the quantitation measurement is finished, the data measured will be stored in the default storage directory of the system and you can view and analyze the measurement result directly. The concentration of the sample is calculated according to the standard curve and when different standard curves are used, the concentrations would differ. Click **Method**, select different curve orders in the **Curve Order** dropdown box and click **Acquisition** to view different curves.



First-order Curve



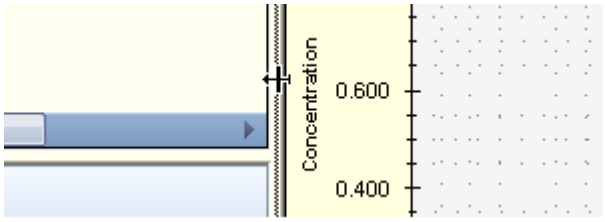
Cubic Curve

Click **Save** in the **Data** option under the **File** menu to save the current data in the default directory; or click **Save As** to save the current data in the specified directory.

Right-click in the standard curve area to perform a series of follow-up operations on the chromatogram via the pop-up dropdown list. For details, refer to Follow-up Operations of Chromatogram.

Tip:

- Click **Close** in the **Data** option under the **File** menu to close the current data file.
- Click the boundary between the table and the standard curve chromatogram, a dotted line as shown in the figure below appears, hold the mouse and drag the dotted line left or right to enlarge or reduce the standard curve area.



Chapter 5 Report and Log

Main topics:

5.1 Report

The report generator is used to generate, edit, save and print the user-defined report. The report could contain pictures, texts and page header/footer. Besides, you can edit the four modules currently measured or opened at the same time.

Main topics:

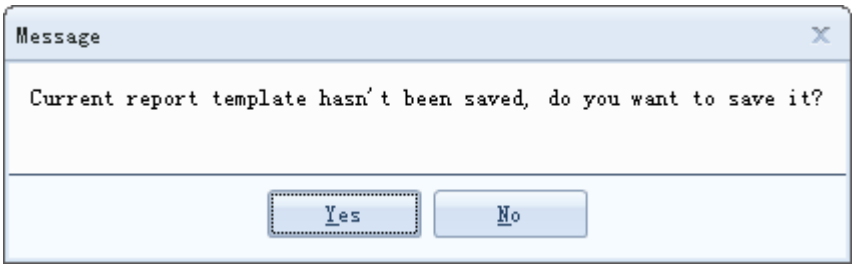
5.1.1 To Create Template

After the measurement is finished, click 

to activate the report window and the software switches to the **UltraUV-Report** interface by default. You can create a new template via this interface or open a template already exists.

Create a new template

To create a new template, click **New** under the **File** menu and the **Message** dialog box will be displayed to ask you whether to save the current report template or not as shown in the figure below. Click **Yes** to save the current template in the specified directory; click **No** to apply the template newly created.

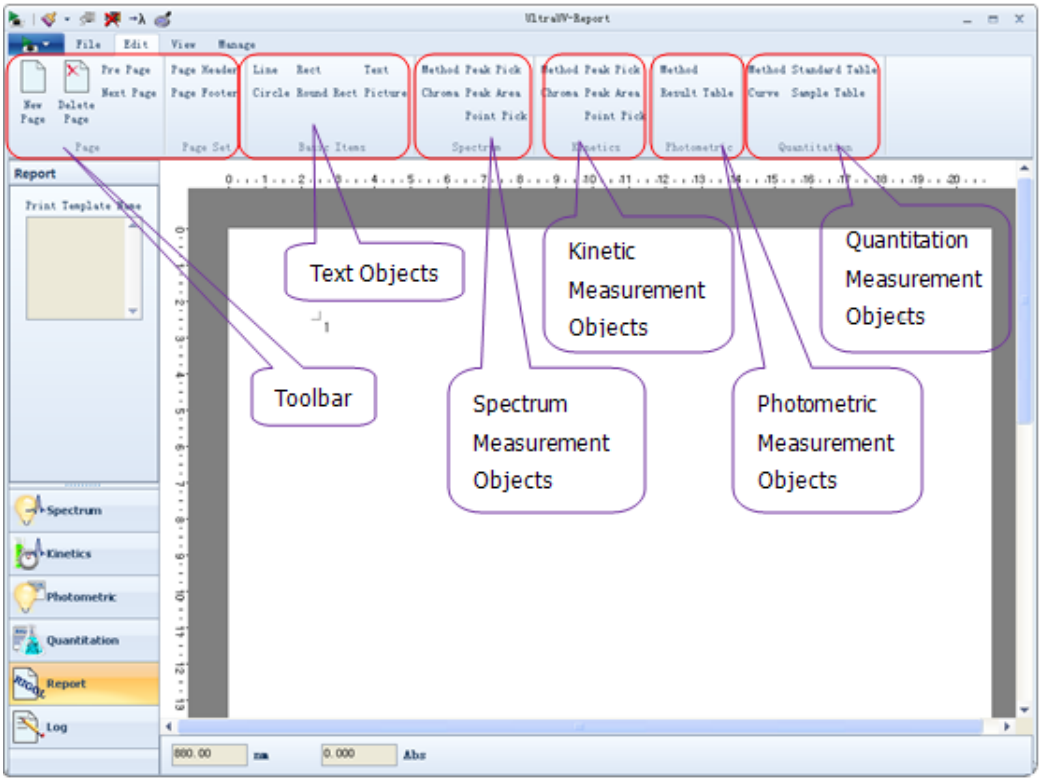


Tip:

- Click **Open** in the **Template** option under the **File** menu to directly recall the template saved.

5.1.2 To Edit the Report

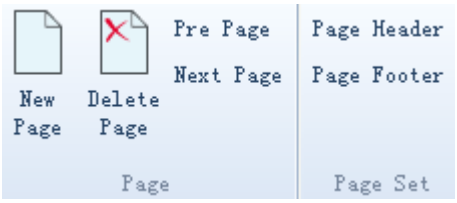
After creating the template, click **Edit** to switch to the editing interface as shown in the figure below to make user-defined editing on the report.



The editing interface mainly consists of the following parts.

- Toolbar
- Text Objects
- Measurement Objects
- View

5.1.2.1 Toolbar



New Page

Create a new page and the page number is displayed at the upper left corner of the page.

Delete Page

Delete the page currently opened.

Pre Page

View the previous page of the current page.

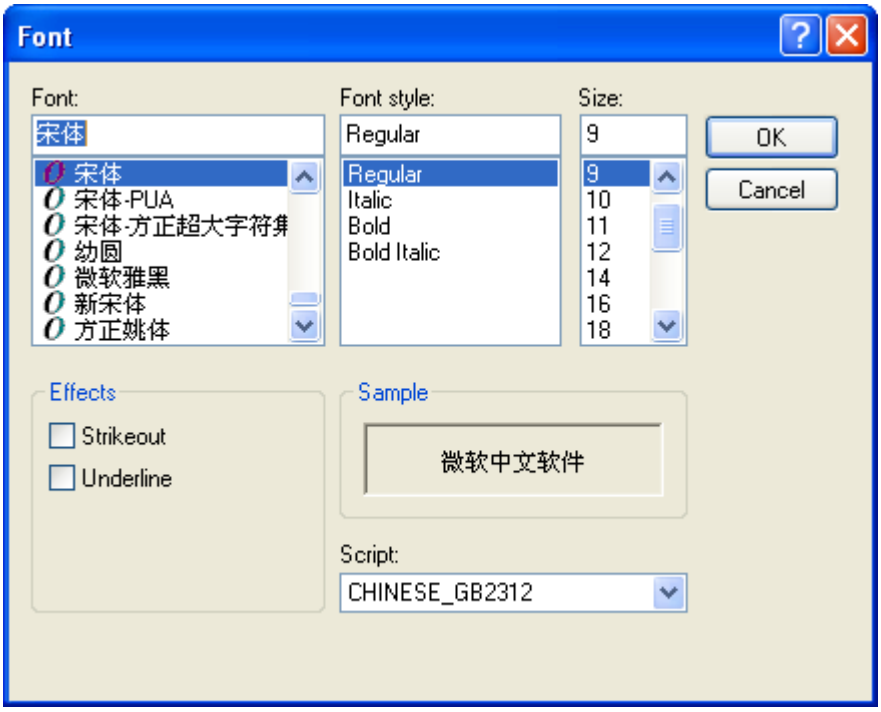
Next Page

View the next page of the current page.

Page Header

Click **Page Header** and input the desired page header in the pop-up **Page Header** dialog box as shown in the figure below.

Click **Font Setting** in the figure above to set the font in the pop-up **Font** dialog box and click **OK**.



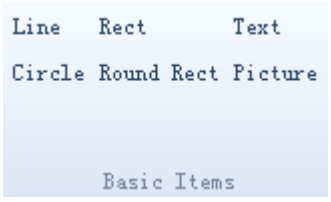
After finishing the setting, click  at the upper right corner of the **Page Header** dialog box.

Page Footer

Refer to **Page Header**.

5.1.2.2 Text Objects

You can insert the following objects into the report.

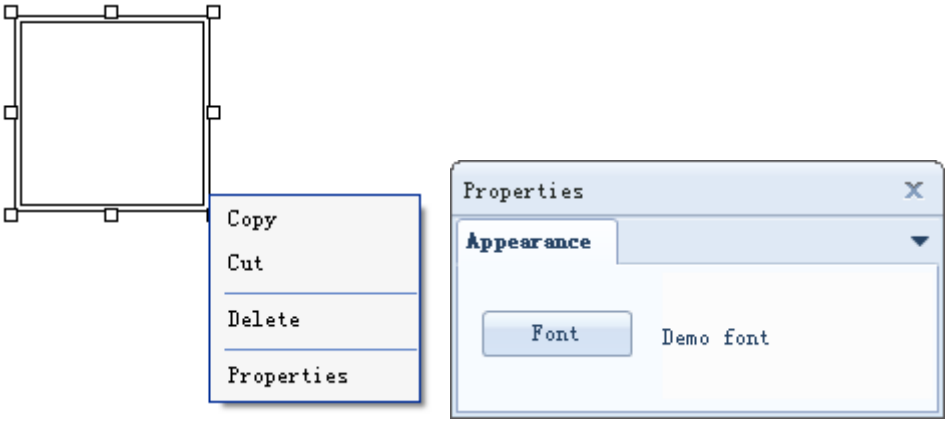


Line / Rect / Circle / Round Rect

Insert the corresponding shape into the report.

Text

Click **Text** and edit in the pop-up textbox. Right-click the textbox, select **Properties** in the pop-up dropdown list, click **Font** in the pop-up **Properties** dialog box to set the font and then click  at the upper right corner of the properties dialog box.



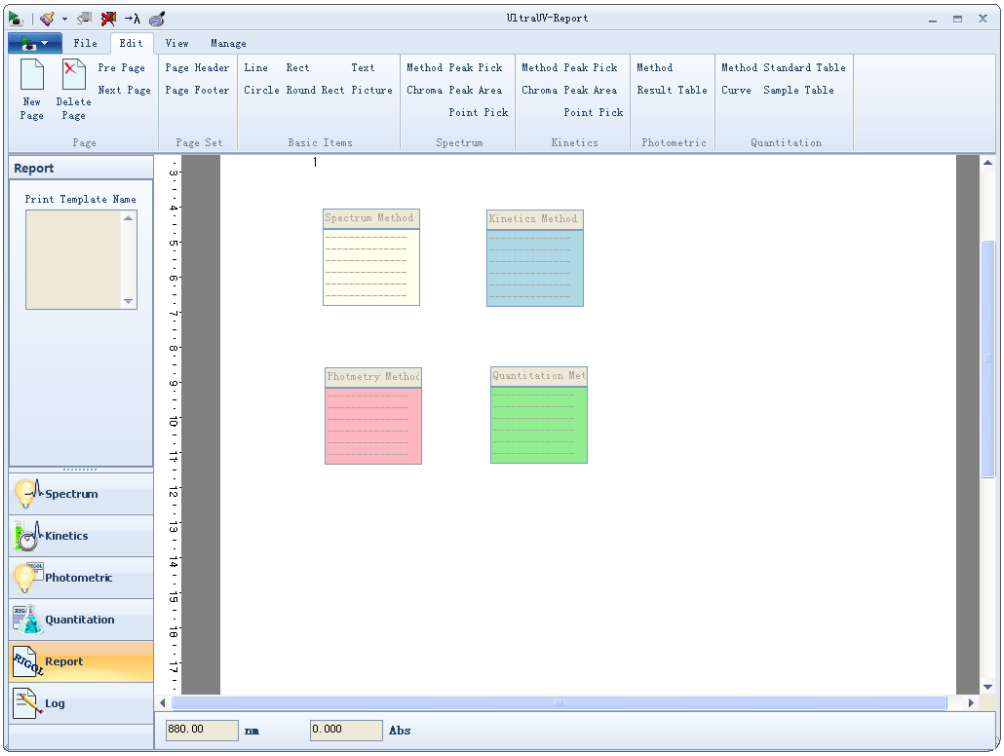
Picture

Click **Picture**, right-click the pop-up picture object, select **Properties** in the pop-up dropdown list, click **Image** in the pop-up **Properties** dialog box to select the desired picture and select the properties of the picture (**Original size** or **Fit Control**) and then click  .

5.1.2.3 Measurement Objects

UltraUV provides four kinds of measurement objects (spectrum measurement objects, kinetic measurement objects, photometric measurement objects and quantitation measurement objects). You can edit the four kinds of measurement objects at the same time and the four kinds of measurement objects are marked with white, blue, pink and green respectively for easy distinguish.

Select the desired object to be saved or printed. Click the corresponding button to display the object on the page as shown in the figure below.



Tip:

- When **Method** is selected, right-click on the object and select **Properties** in the pop-up dropdown list to set the font of the method in the pop-up **Properties** dialog box.

For the related operations of the object, refer to "**Follow-up Operations of Editing**".

5.1.2.4 View

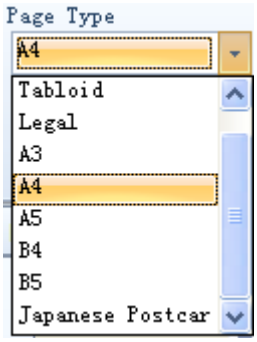
In the **View** menu, you can set the page view and zoom scale.

Page View

Click **View** and make settings in the **Page View** option.

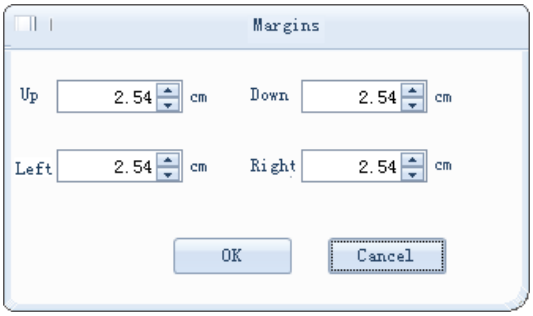
Page Type

Click the **Page Type** textbox and select the desired type from the dropdown list.



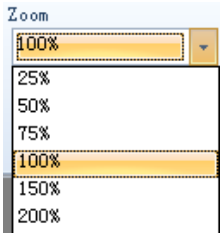
Page Margins

Click **Page Margins** and make settings in the pop-up **Margins** dialog box. Click **OK** to apply the current settings; click **Cancel** to give up the current settings.



Report View

Click the **Zoom** textbox under the **View** menu and select the desired zoom scale from the pop-up dropdown list.



5.1.3 Follow-up Operations of Editing

You can perform the following operations after selecting the object to be edited.

Move the object

The objects selected are all displayed at the same position at the upper left corner of the page and you need to move them to the proper positions manually. Click and hold on the object to move it.

Delete the object

Click on the object and then press **Delete** on the keyboard to delete the object; or right-click on the object and then select **Delete** from the pop-up dropdown box.

Copy/Cut/Paste

Right-click on the object and select **Copy** or **Cut** from the pop-up dropdown box, then right-click on the blank of the page and click **Paste**.

Zoom in or out the object

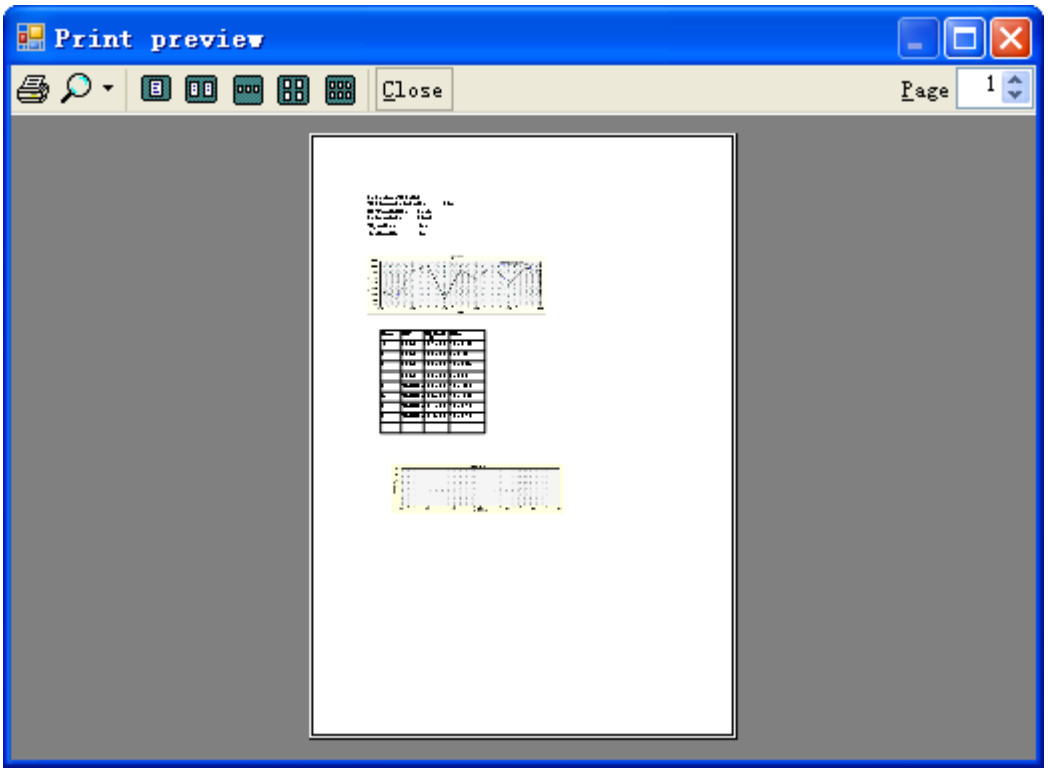
Click on the desired object. At this point, size control points appear on the four corners and the middle point of each edge. Place the mouse on the control point, click and hold, then drag the mouse to zoom in or out the object.

5.1.4 Print and Store

You can print or store the report for future use after editing the report.

Print Preview

Click **Print Preview** under the **File** menu to view the report to be printed and stored in the pop-up **Print preview** dialog box. You can set the page according to the size of each object and for the operations of the object, refer to "**Follow-up Operations of Editing**".



Print

Click **Print** under the **File** menu to print the report.

Save/Save As

Click **Save** under the **File** menu to save the report in the default directory; click **Save As** to save the report in the specified directory.

5.1.5 Operation Example

As the report editing methods of the four modules are similar, spectrum measurement is taken as an example to illustrate how to print the report.

Operation procedures:

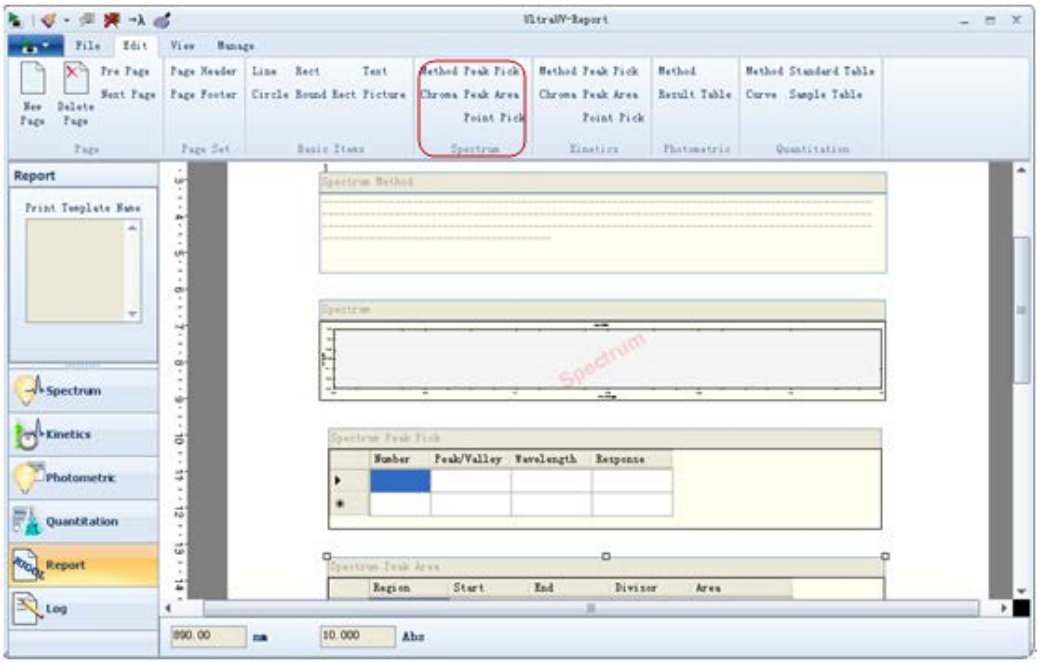
Step1:

Click 

to activate the report window after the spectrum measurement or the data processing of the spectrum measurement is finished. The software switches to the **UltraUV-Report** interface by default. You can create a new template or open a template already exists via this interface. For details, refer to **To Create Template**.

Step2:

Click **Edit** after creating the template to switch to the report editing interface to make user-defined editing on the report. Select the object (such as the method, chromatogram and peak pick) to be printed as shown in the figure below. For the report editing method, refer to **To Edit the Report**.



Step3:

You can print and save the report after the editing is finished. For details, refer to **Print and Store**.

Tip:

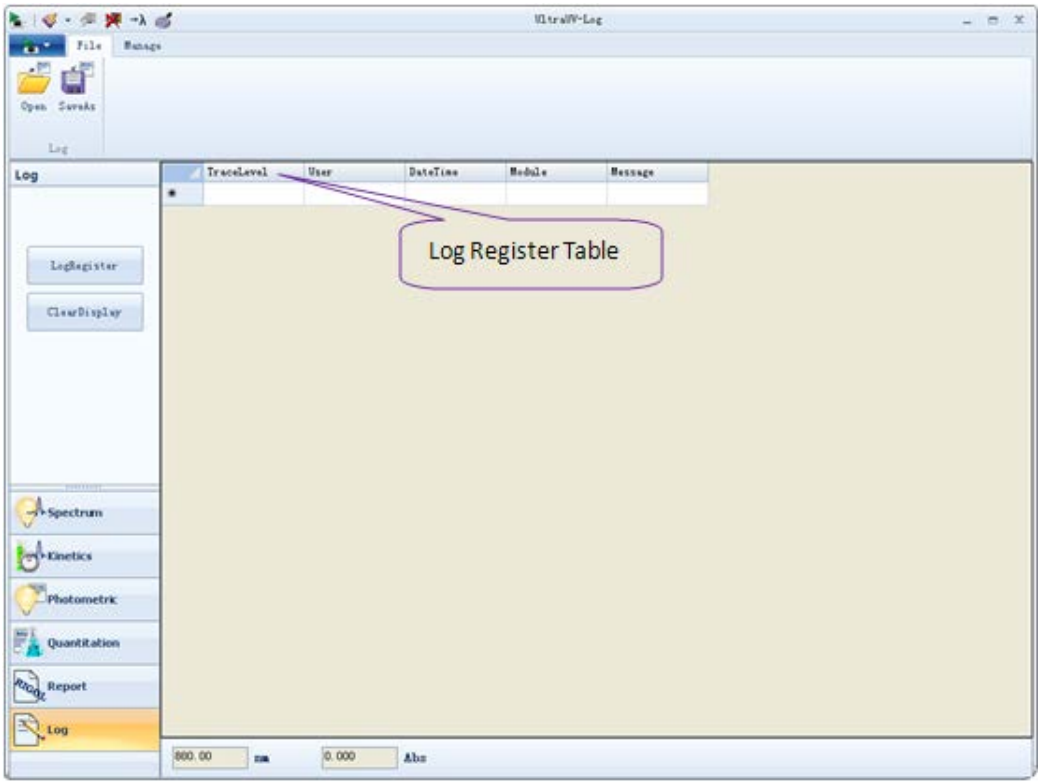
- The chromatogram printed contains all the chromatograms currently opened. The method, peak pick table and peak area table are all the chromatogram files in the active mode.

5.2 Log

This software provides special log record function to facilitate your record of the related information during the operation. Besides, the system records and save the login information (include the user name, specific time and date of each login) everyday automatically. The default directory of the automatic storage is the UVLog folder under the directory of the installation file.

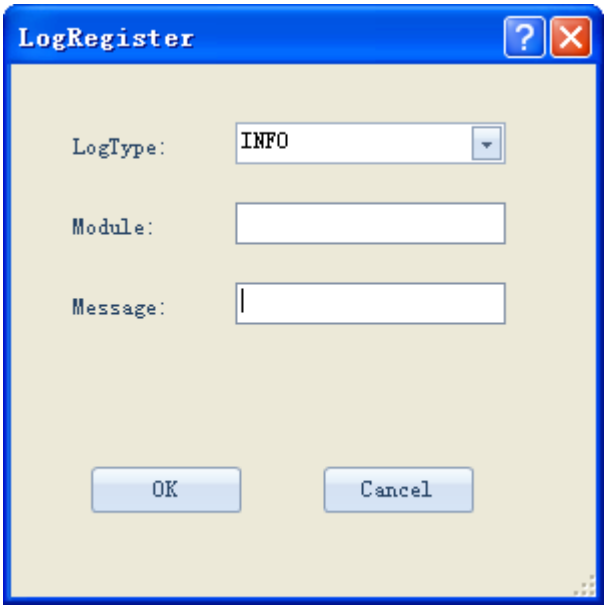
Click 

and the instrument switches to the **UltraUV-Log** interface automatically as shown in the figure below.



LogRegister

Click **LogRegister** at the left and edit in the pop-up dialog box.



LogType

Click the **LogType** textbox and select the desired log type (**INFO**, **WARNING** and **ERROR)** from the pop-up dropdown list.

Module

Input the module to be recorded in the textbox.

Message

Input the related information to be recorded in the textbox.

OK

Click **OK**, the log edited will be displayed in the **Log Register Table** and the user name and current time will be generated in the corresponding tables automatically.

Cancel

Click **Cancel** to give the current record.

ClearDisplay

Click **ClearDisplay** at the left to clear all the records in the **Log Register Table**.

Tip:

- Click **Open** under the **File** menu to view the log saved; click **Save As** to save the log in the specified directory.

Chapter 6 Troubleshooting

The commonly encountered problems and their solutions are listed below for your analysis and process the common problems. If the problem remains after taking the corresponding solution or the problem is not contained in the table below, please contact **RIGOL**.

The commonly encountered problems and their solutions are as follows.

Faults	Possible Reason	Solution
Instrument can not be connected.	Whether the instrument is powered on correctly	Check whether the power cord is properly connected and whether the instrument is started
	The communication port is occupied	Please use a free port or free the port
	The instrument is damaged	Contact **RIGOL**
	Connection is wrong	Contact **RIGOL**
Self-test fails	The lamp is aged and can not be turned on	Replace the lamp
	The photomultiplier is aged	Replace the photomultiplier
	There is sample in the sample compartment and the light can not pass through	Take out the sample in the sample compartment
	The optical parts are aged	Contact **RIGOL**
	The circuit board is aged	Contact **RIGOL**
The absorbance can not return to zero	The service life of the lamp expires	Replace the lamp
	The photomultiplier is aged	Replace the photomultiplier

	Preamplifier circuit failure	Contact **RIGOL**
The deuterium lamp does not light up	The service life of the deuterium lamp expires	Replace the deuterium lamp
	The environment temperature is too low	Make sure the environment temperature is above 15℃
	Deuterium lamp power circuit failure	Contact **RIGOL**
The tungsten lamp does not light up	The tungsten lamp filament is blown	Replace the tungsten lamp
	Circuit failure	Contact **RIGOL**
The absorbance value is negative	Blank memory is not performed and the absorbance of the sample is lower than that of the blank reference solvent	Perform blank zero
	Circuit failure	Contact **RIGOL**