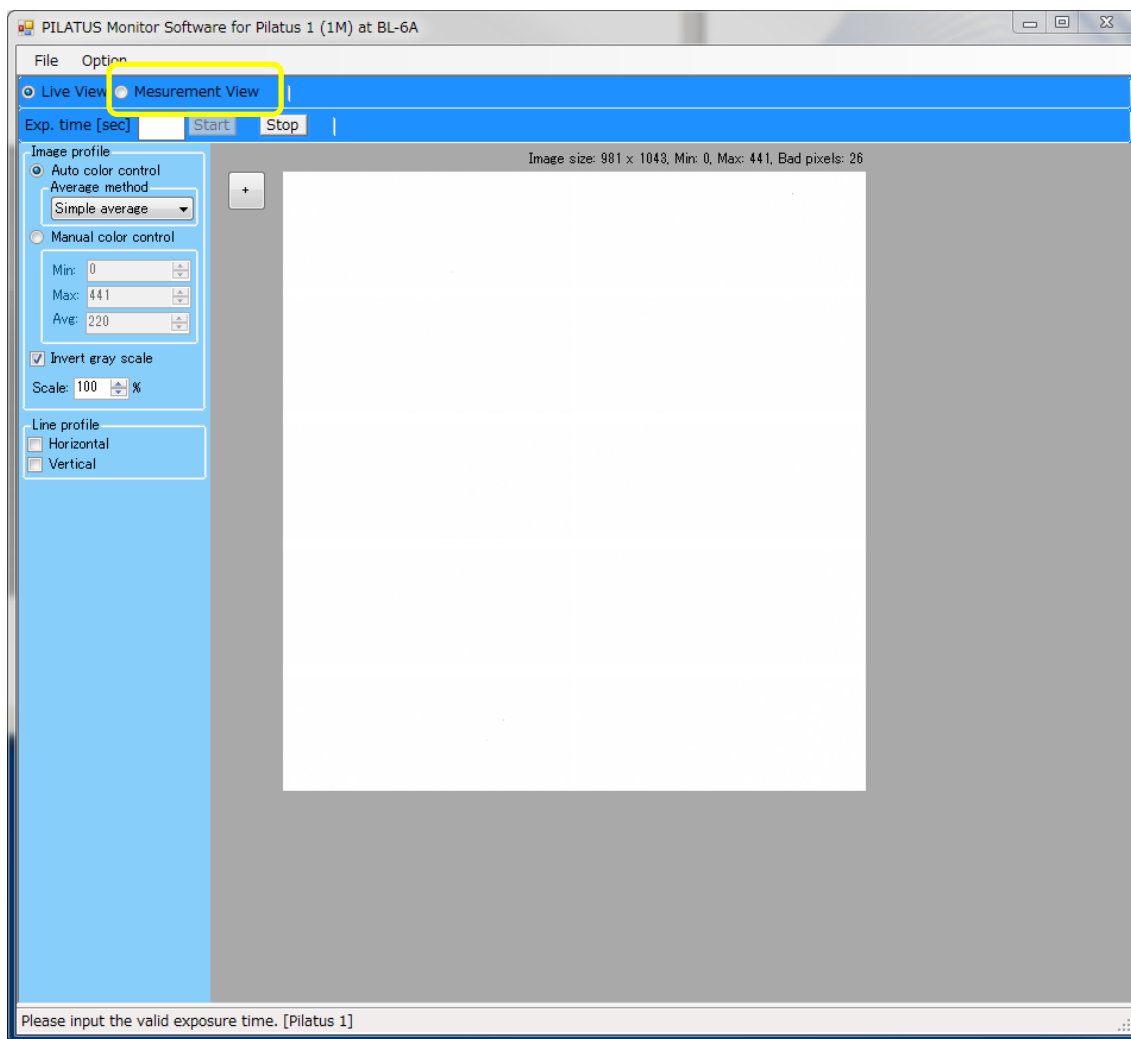Procedure Manual for Measurement Software – Nov.30.2017

For Users

1.SAXS Measurement Methodology

- Select the "Measurement View" radio button on the PILATUS Monitor Software for Pilatus1(1M) at BL-6A, PILATUS Monitor Software for Pilatus1(2M) at BL-10C, or PILATUS Monitor Software for Pilatus1(2M) at BL-15A2 on the measurement PC.

- Determine the measurement conditions.
- For example, if you set the wavelength to 1.5 Å, the number of measurements to 1, and the exposure time to 5 seconds, input the following values into the PIRATUS Measurement Control Software.

        Directory: Please enter the storage location for the files.

File prefix: Enter the word that will be used as a prefix for the files (e.g., test001).

File type: Choose between tif or cbf.

Monochromator control: Select 1.5 (auto-tune will perform a dTheta scan).
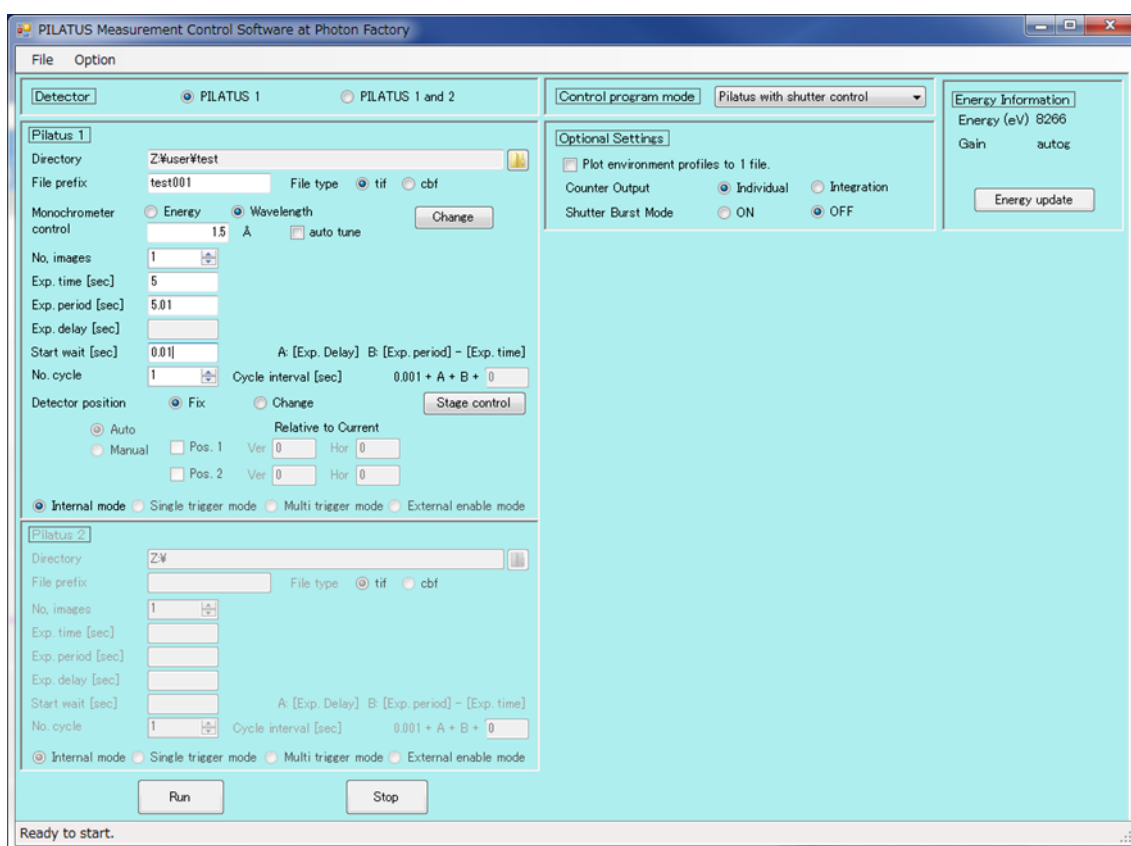
No. of Image: 1

Exp. time: 5

Exp. period: 5.01

Exp. delay: Do not enter any value.

Stop wait: 0.01

No. Cycle: 1

- Press the "Run" button at the bottom left to start the measurement.

- In this case, the file name will be "test001_00000(number of measurements).tif" or "test001_00000(number of measurements).cbf". Tif files can be viewed anywhere, but cbf files have approximately three times the file size. To open cbf files, you will need the PIRATUS Monitor Software.

- To perform detector translation and merge the data from the GAP region of the PILATUS detector with another image, please continue with the following steps. The image data

merging can be achieved using the Synthesizer software for image data fusion.

- Select "change" from the Detector Position and then choose between "Auto" or "Manual." If you select "Manual," please input the Vertical (Ver.) and Horizontal (Hor.) values for Pos.1 and Pos.2.
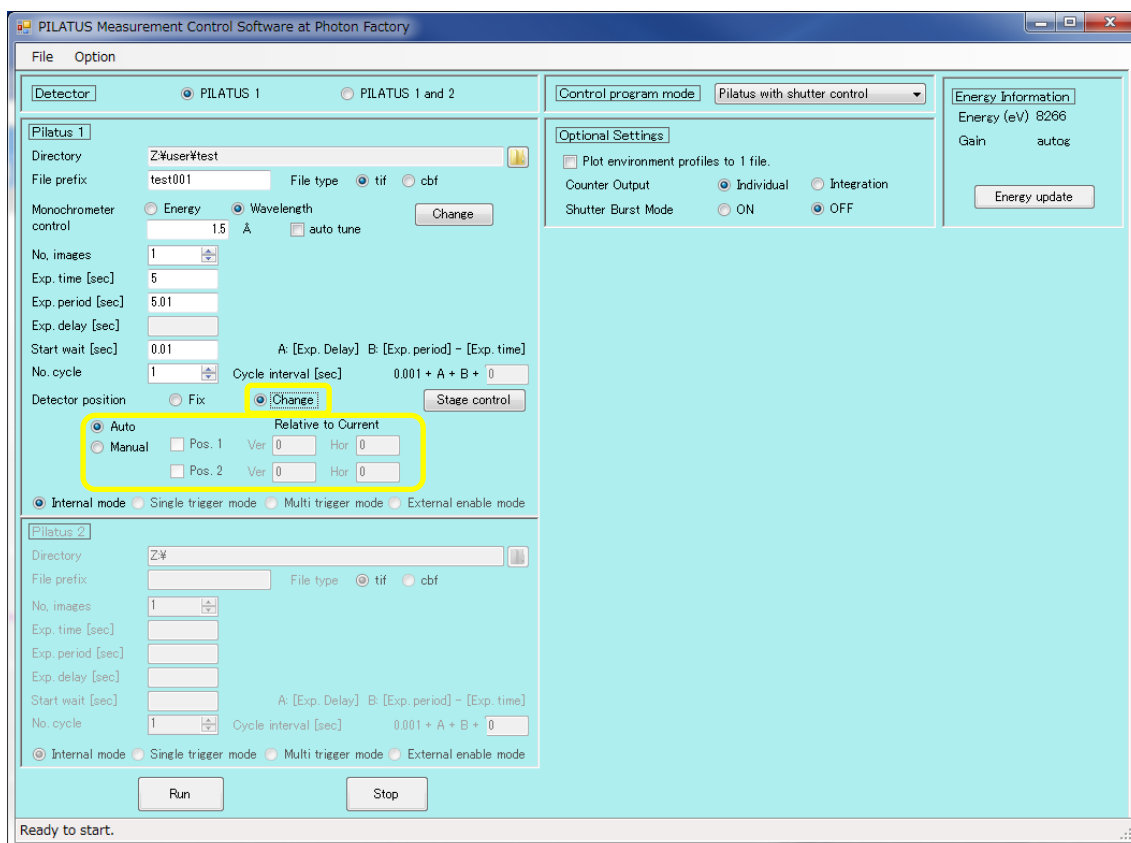
- Press "Run" to start the measurement.

- The file name will be "test001_d0(detector position)_00000(number of measurements).tif" or "test001_d0(detector position)_00000(number of measurements).cbf".

- Here is the description of the "Control program mode":

  None: Select this option when manually opening and closing the shutter.

  PILATUS with shutter control:

    Choose this option when controlling the shutter from the PILATUS side.

  SEC-SAX-UV measurement:

    Select this option when using SEC-SAXA.

  Single trigger mode:

    Choose this option when conducting measurements in synchronization with an external trigger.

Single trigger mode serial shutter:

    Select this option when conducting measurements in synchronization with an external trigger and controlling the shutter via serial communication.

Single trigger mode no shutter:

    Choose this option when conducting measurements in synchronization with an external trigger and manually operating the shutter.

Not available:

    This option is not available for use.

Here is the description of the "Optional Setting":

Plot environment profile to 1file:

    Check this option if you want to consolidate the counter files into one file.

Counter Output:

    Choose between individual values (Individual) or integrated values (Integration) for the counter file.

Shutter Burst Mode:

    This mode allows the shutter to open and close along with the exposure time. Normally, the shutter remains open during one measurement cycle, but by enabling Burst mode, the shutter can open and close within a single cycle, avoiding unnecessary exposure. This option is not available when the exposure period is less than 0.5 seconds. It is only applicable in the Single trigger mode.

2. WAXD Measurement Methodology

- Here, we assume that WAXD is already installed.
- Select the "Measurement View" radio button on the PILATUS Monitor Software for Pilatus2(100K) at BL-6A, PILATUS Monitor Software for Pilatus2(200K) at BL-10C, or PILATUS Monitor Software for Pilatus2(300KW) at BL-15A2 on the measurement PC.
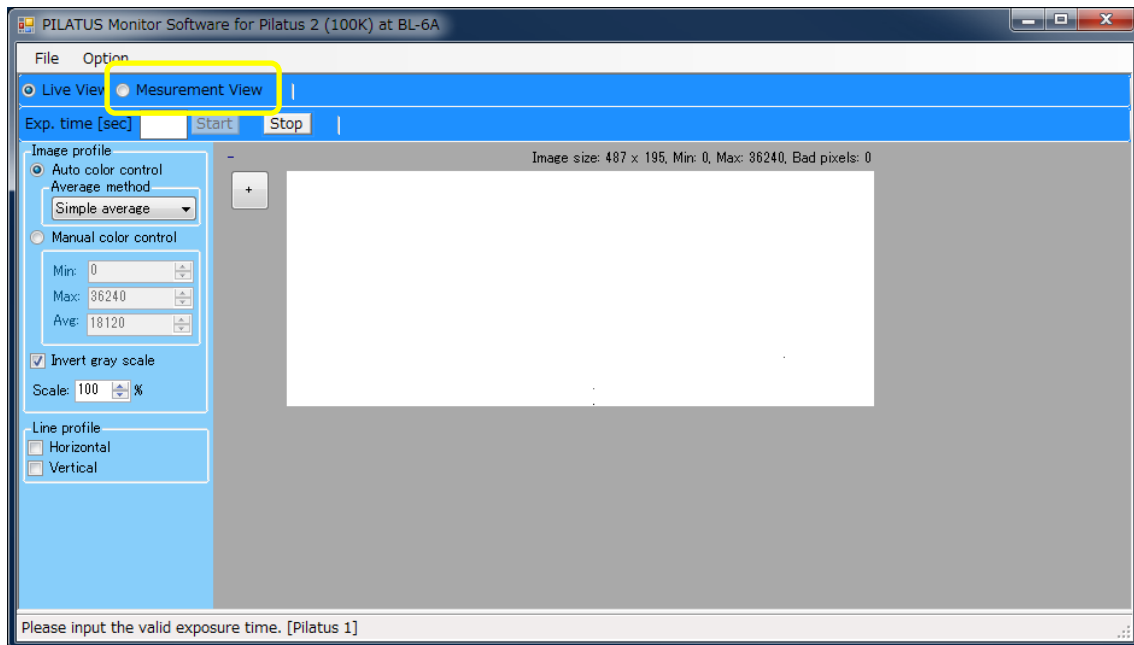
- Determine the measurement conditions.

- For example, if you set the number of measurements to 1 and the exposure time to 30 seconds, input the following values into the PIRATUS Measurement Control Software.

> Directory: Please enter the storage location for the files.
>
> File prefix: Enter the word that will be used as a prefix for the files (e.g., test002).
>
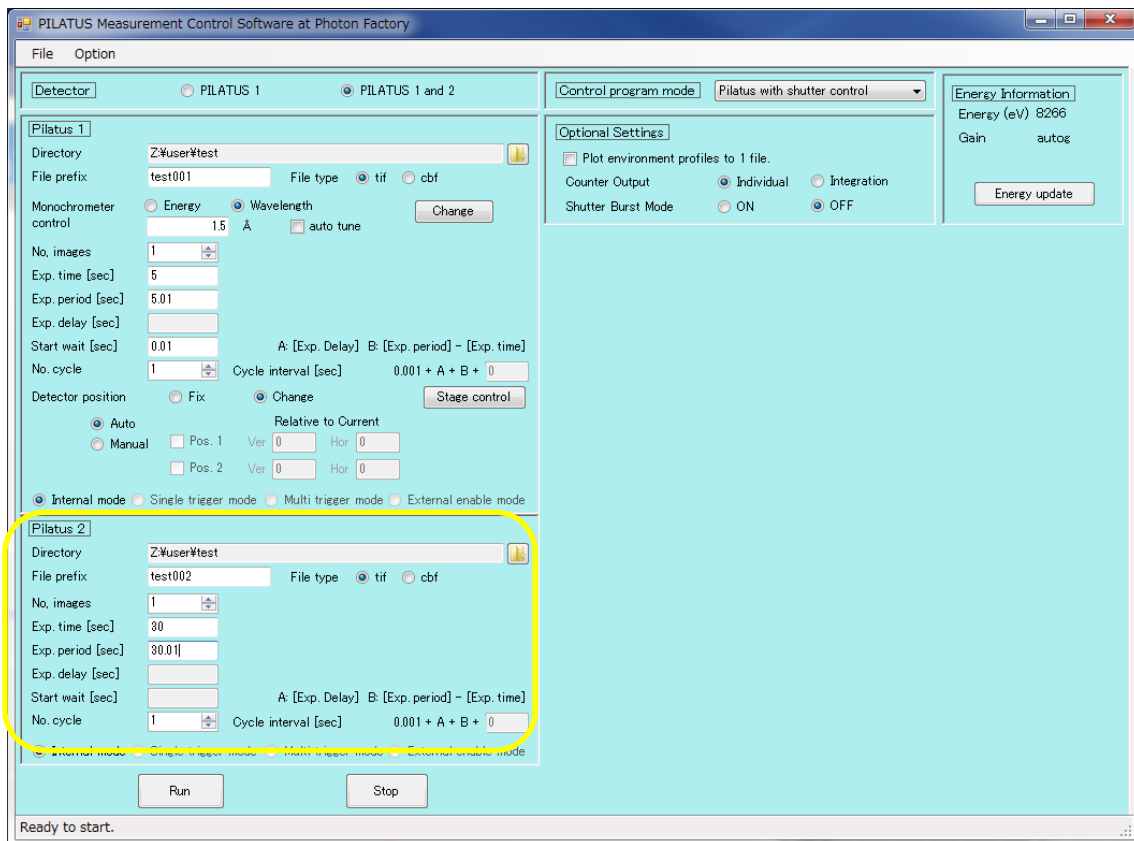> File type: Choose between tif or cbf.
>
> No. of Image: 1
>
> Exp. time: 30
>
> Exp. period: 30.01
>
> Exp. delay: Do not enter any value.
>
> Stop wait: Do not enter any value.
>
> No. Cycle: 1

- Press "Run" at the bottom left to start the measurement.

- In this case, the file name will be "test002_00000(number of measurements).tif" or "test002_00000(number of measurements).cbf".

3.Measurement Method for Rotational Sample Changer

- Here, we assume that the rotational sample changer is already installed.

- Please click on "Stage Control" in the PILATUS Measurement Control Software at Photon Factory.
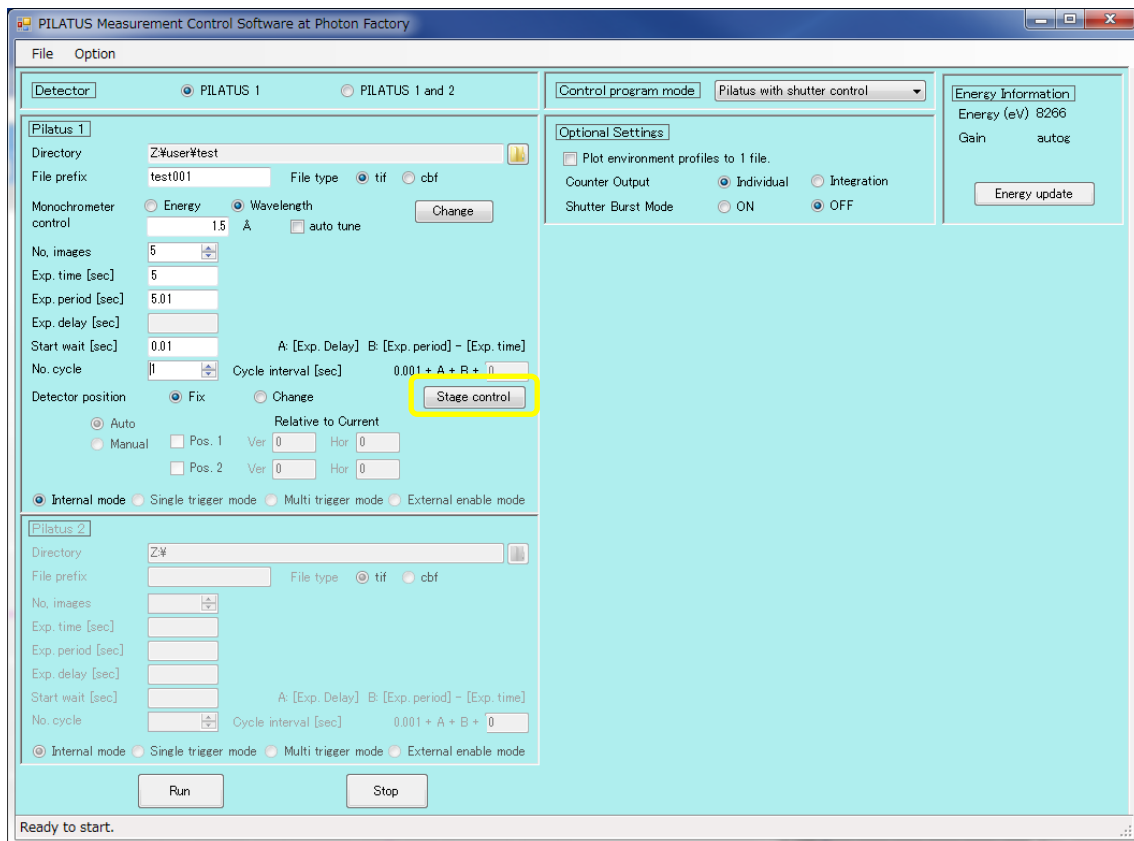
- Select "Use rotary sample changer" from the Stage type. Choose the measurement positions for the holes and click OK to close. The following is an example of measuring all the holes.
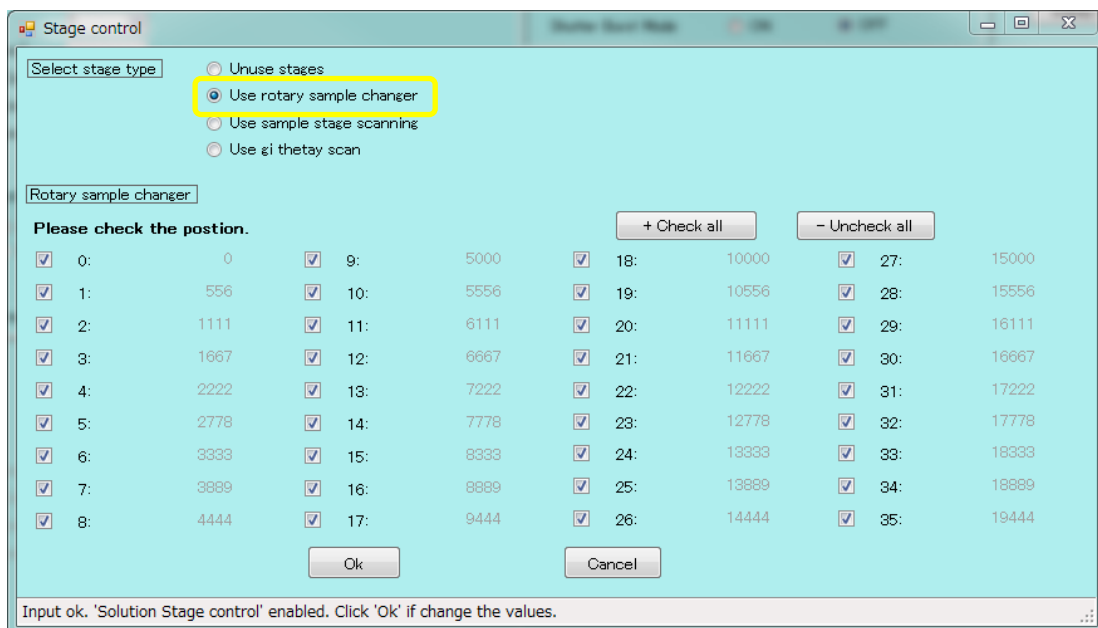
- The "No. Cycle" will be automatically set according to the number of selected holes. The

measurements will be distinguished based on the sample position = Cycle number.

- Determine the measurement conditions.

- For example, if you set the wavelength to 1.5 Å, the number of measurements to 5, exposure time to 5 seconds, and the number of cycles to 36, input the following values.

        Directory: Please enter the storage location for the files.

        File prefix: Enter the word that will be used as a prefix for the files (e.g., test001).

        File type: Choose between tif or cbf.

        Monochromator control: 1.5 (Selecting auto tune will perform dTheta scan.)

        No. of Image: 5

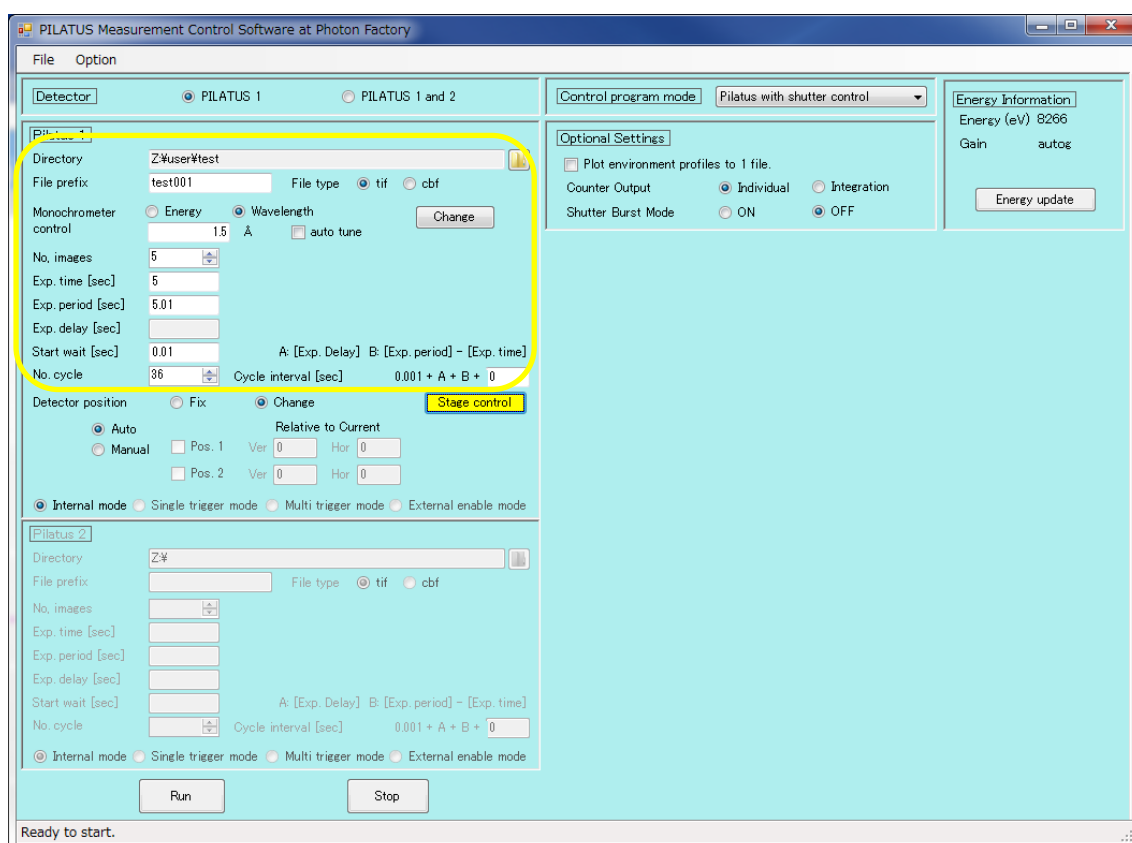   Exp. time: 5

        Exp. period: 5.01

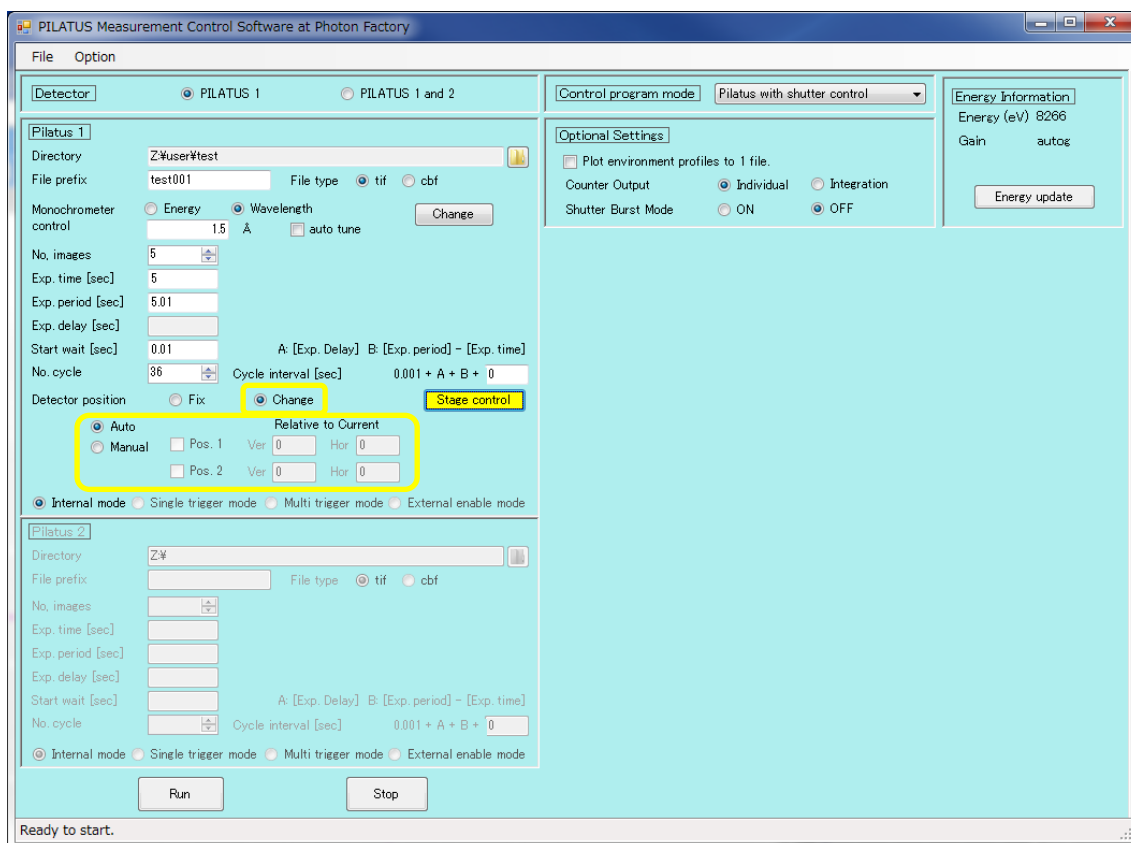   Exp. delay: Do not enter any value.

        Stop wait: 0.01

        No. Cycle: 36

- Press "Run" in the PILATUS Measurement Control Software at Photon Factory to start the measurement. The file name will be "test001_00(hole position)_00000(number of measurements).tif" or "test001_00(hole position)_00000(number of measurements).cbf".

- If you want to move the detector translationally, continue with the following steps.

- Select "change" from the Detector position and then choose between "Auto" or "Manual." If you select "Manual," please input the Vertical (Ver.) and Horizontal (Hor.) values for Pos.1 and Pos.2.


- Press the "Run" button to start the measurement.

- The file name will be "test001_00 (hole position)_d0 (translation position)_00000 (number of measurements).tif" or "test001_00 (hole position)_d0 (translation position)_00000 (number of measurements).cbf".

4. Measurement method for sample stage scan.

- Please click on "Stage Control" from the PILATUS Measurement Control Software at Photon Factory.
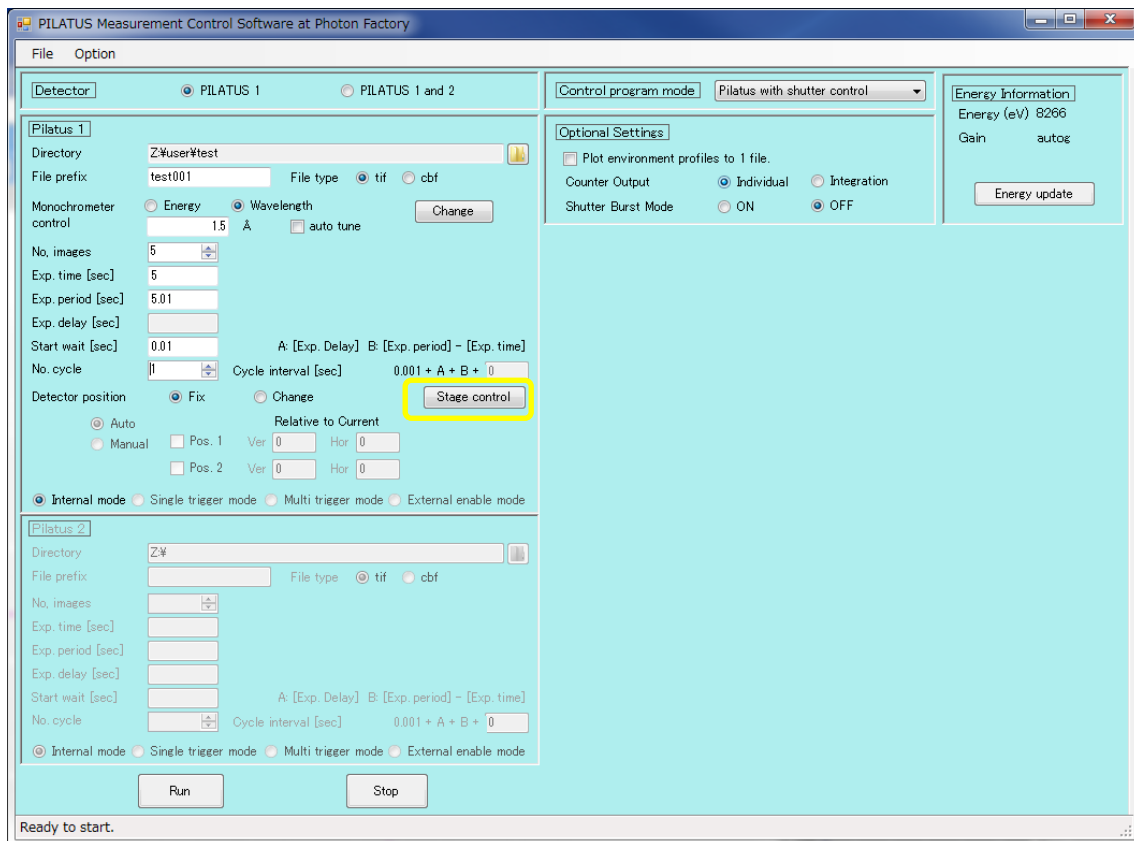
- In "Select Stage type," choose "Use sample stage scanning." Input the scan range, step, and direction.
- In the following example, vertical scanning will be conducted at 9 positions, with a step size of 0.1mm, ranging from (-0.1mm, -0.1mm) to (0.1mm, 0.1mm).
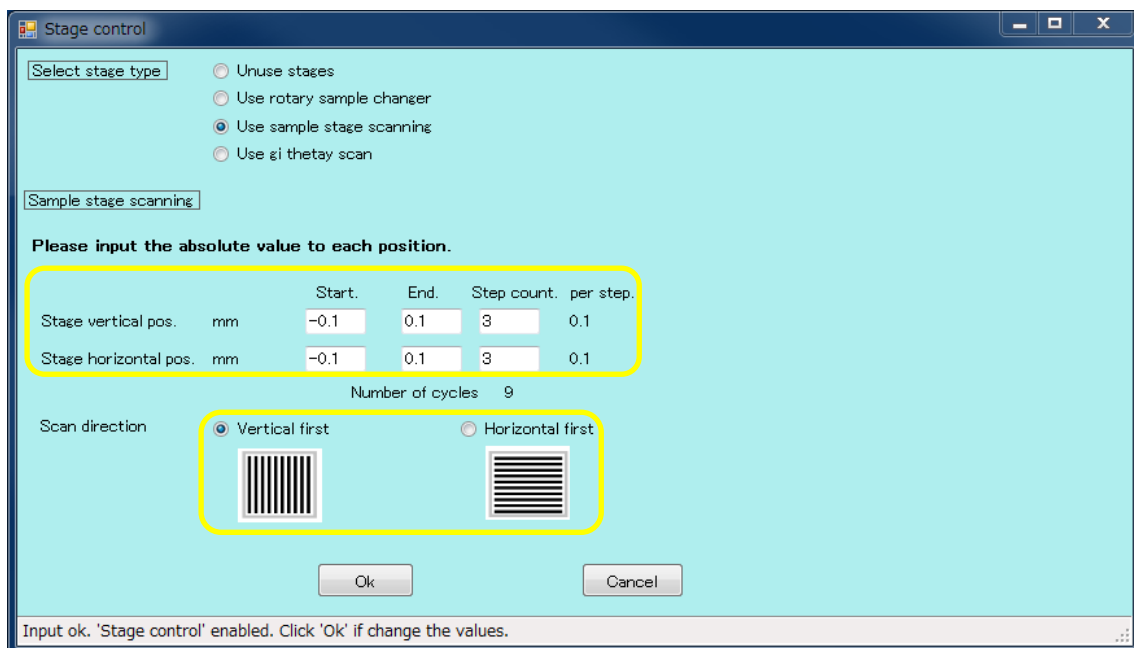
- The "No. Cycle" will be automatically set according to the selected Step count.

- Determine the measurement conditions.

- For example, if you set the wavelength to 1.5 Å, the number of measurements to 10 frames, and an exposure time of 5 seconds for 9 cycles, enter the following values.

> Directory: Please input the destination for storing files.
>
> File prefix: The word that will be at the beginning of the file (e.g., test002).
>
> File type: Select either tif or cbf.
>
> Monochromator control:
>
> > Choose 1.5 (auto-tuning will perform a dTheta scan).
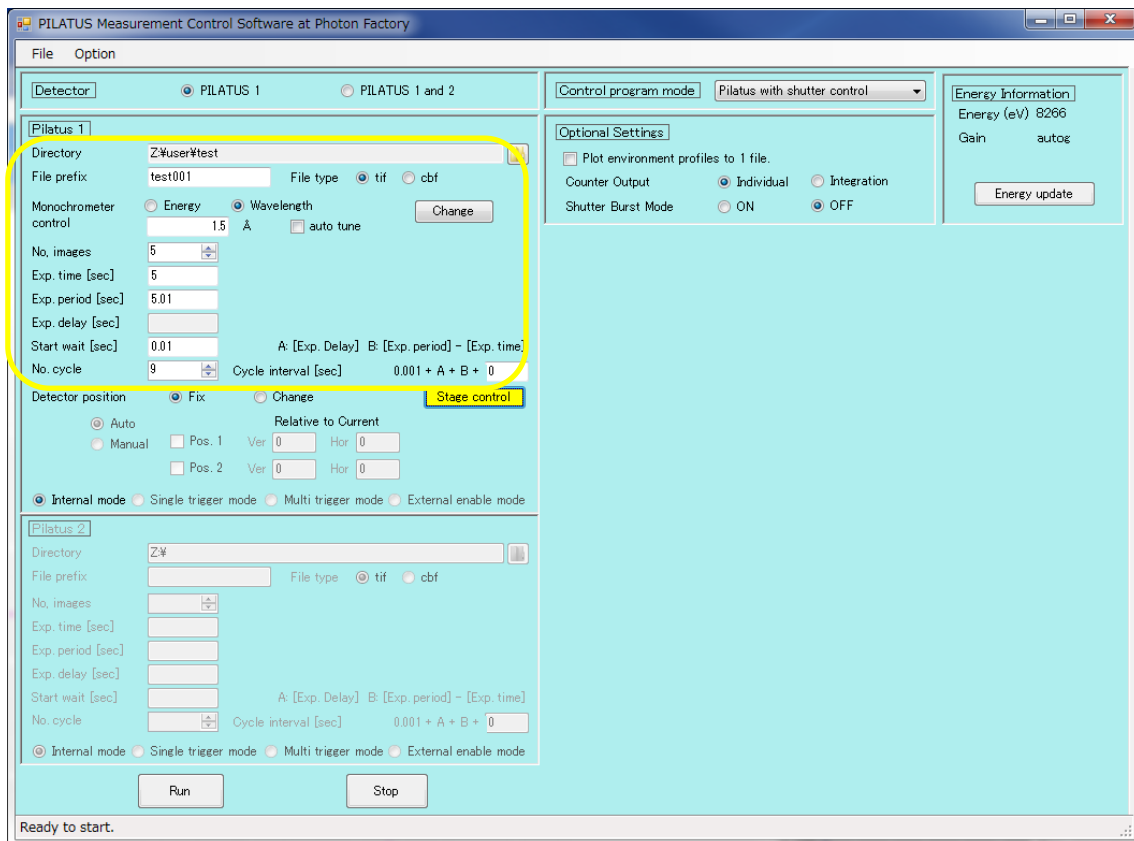>
> No. of Image: 10
>
> Exp. time: 5
>
> Exp. period: 5.01
>
> Exp. delay: Do not input.
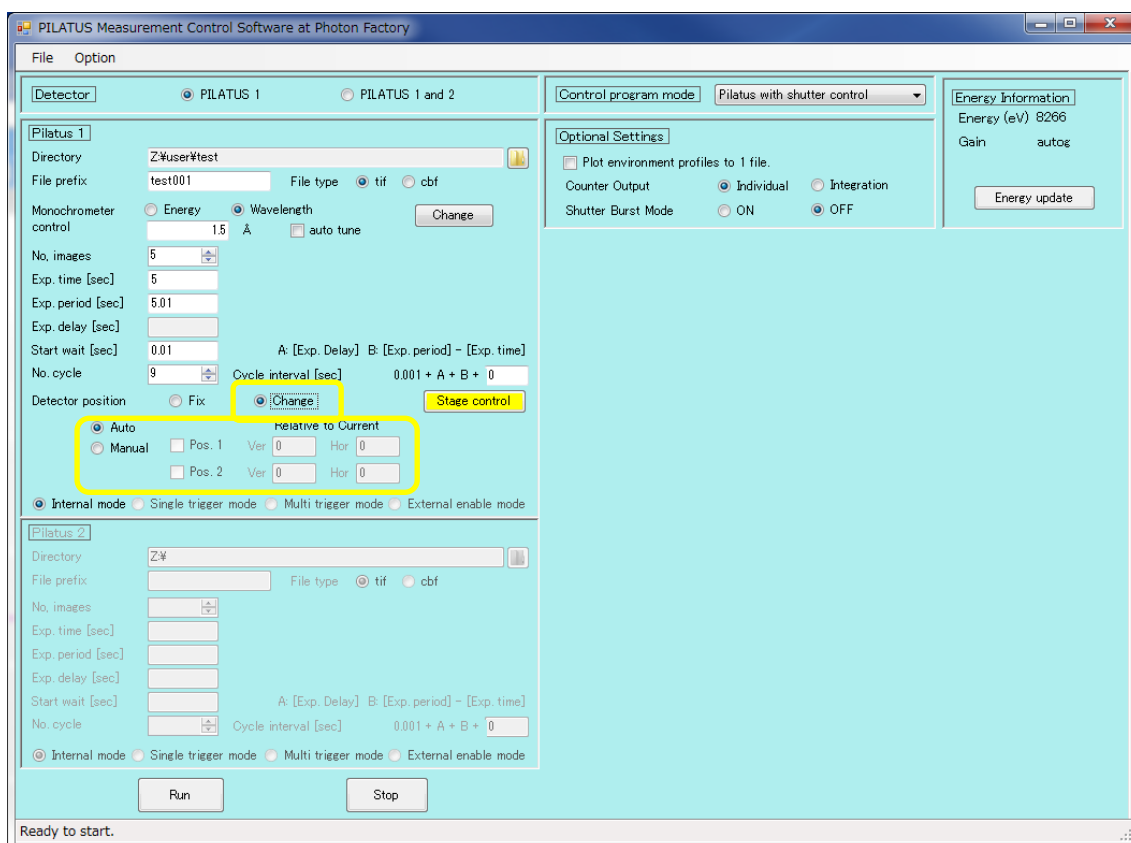>
> Stop wait: 0.01
>
> No. Cycle: 9

- Press "Run" in the PILATUS Measurement Control Software at Photon Factory to start the measurement. The file name will be "test001_00 (measurement position)_00000 (number of measurements).tif" or "test001_00 (measurement position)_00000 (number of measurements).cbf".

- If you want to perform detector translation, continue with the following steps.

- Select "change" from Detector position, and then choose either "Auto" or "Manual." If you select "Manual," please input Ver. and Hor. for Pos.1 and Pos.2.

- Press "Run" to start the measurement.

- The file name will be "test001_00 (measurement position)_d0 (translation position)_00000 (number of measurements).tif" or "test001_00 (measurement position)_d0 (translation position)_00000 (number of measurements).cbf".

5.Measurement method for the GI stage.

- Here, we will explain assuming that the GI stage has already been installed.

- Determine the measurement conditions.

- For example, if you set the wavelength to 1.5 Å, the number of measurements to 5 frames, and an exposure time of 5 seconds for 1 cycle, enter the following values.

      Directory: Please enter the storage location for files.

      File prefix: The word that will be at the beginning of the file (e.g., test001).
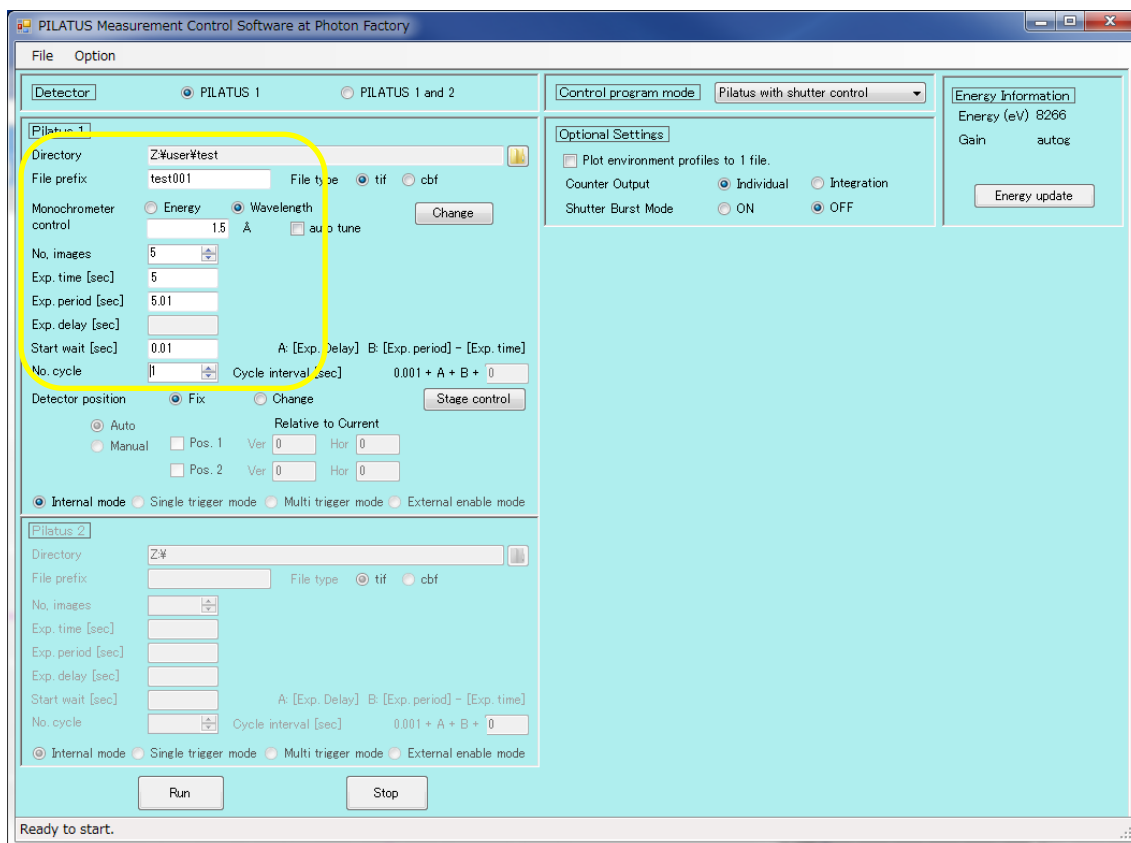
      File type: Select either tif or cbf.

   Monochromator control:

            Choose 1.5 (selecting auto tune will perform a dTheta scan).

   No. of Image: 5

Exp. time: 5

Exp. period: 5.01

Exp. delay: Do not input.

Stop wait: 0.01

No. Cycle: 1

- Press "Run" in the PILATUS Measurement Control Software at Photon Factory to start the measurement. The file name will be "test001_00000 (number of measurements).tif" or "test001_00000 (number of measurements).cbf".

- Measurement while varying ThetaY is performed using the following steps.

- Please click on "Stage Control" in the PILATUS Measurement Control Software at Photon Factory.
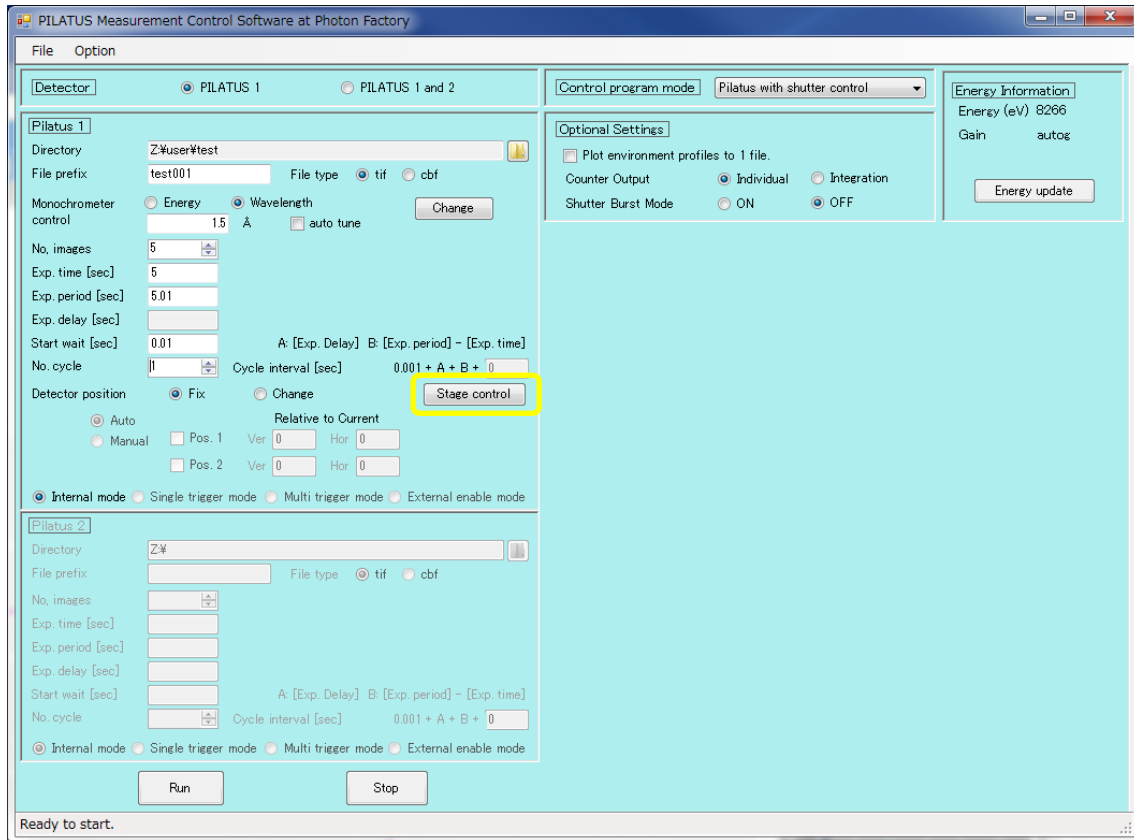
- In "Select Stage type," choose "Use gi thetay scan." The following screen is an example of scanning from -0.1° to -1° in steps of 0.01°. For "per Step," indicate the scanning direction by adding a minus sign, and input up to three decimal places in this case. Close with OK.
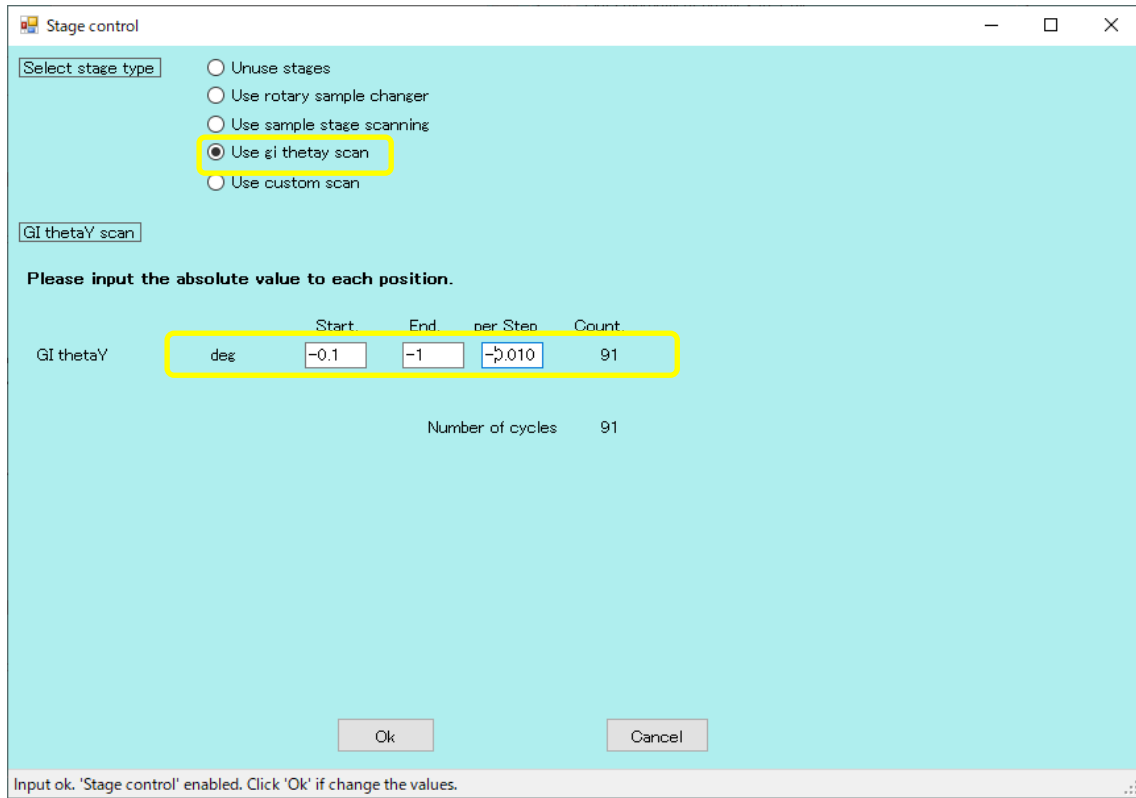
- Press "Run" to start the measurement.
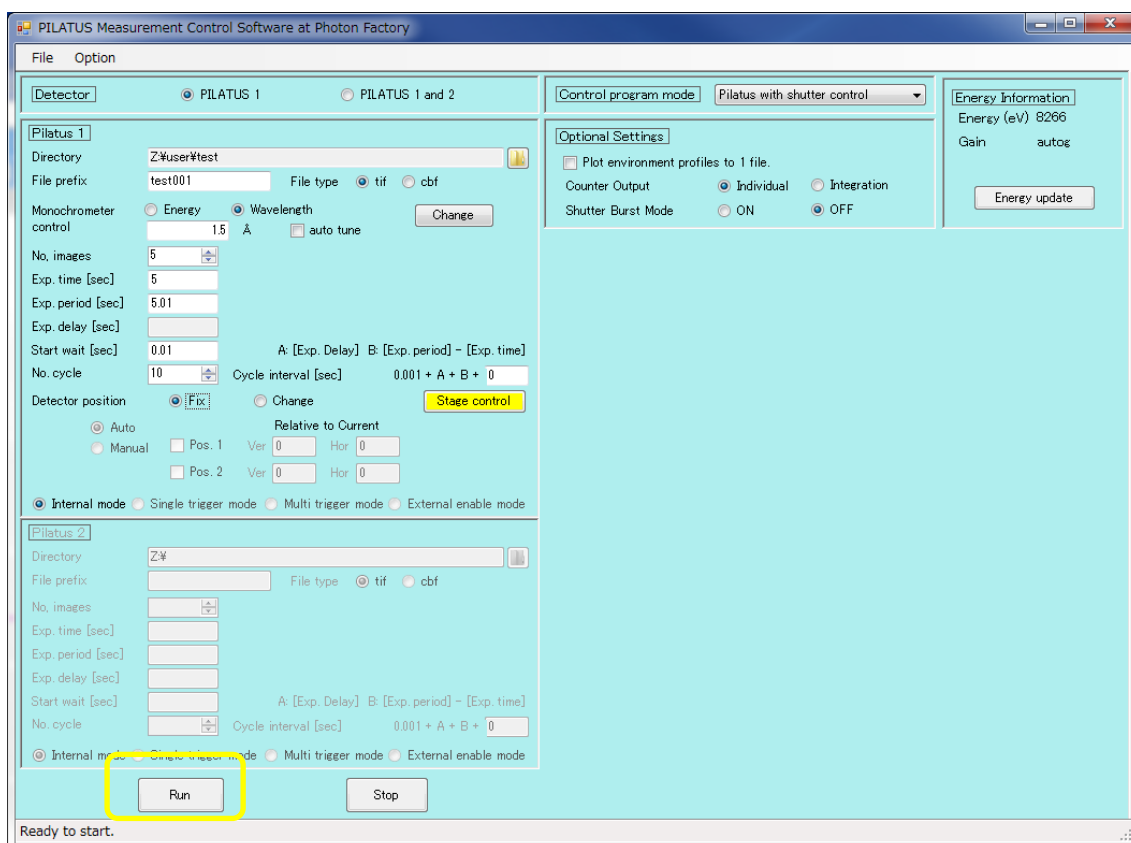
- For the given case, the output file name will be "test001_00 (measurement position)_00000 (number of measurements).tif" or "test001_00 (measurement position)_00000 (number of measurements).cbf".

- If you want to perform detector translation, continue with the following steps.

- Select "change" from Detector position, and then choose either "Auto" or "Manual." If you select "Manual," please input Ver. and Hor. for Pos.1 and Pos.2.
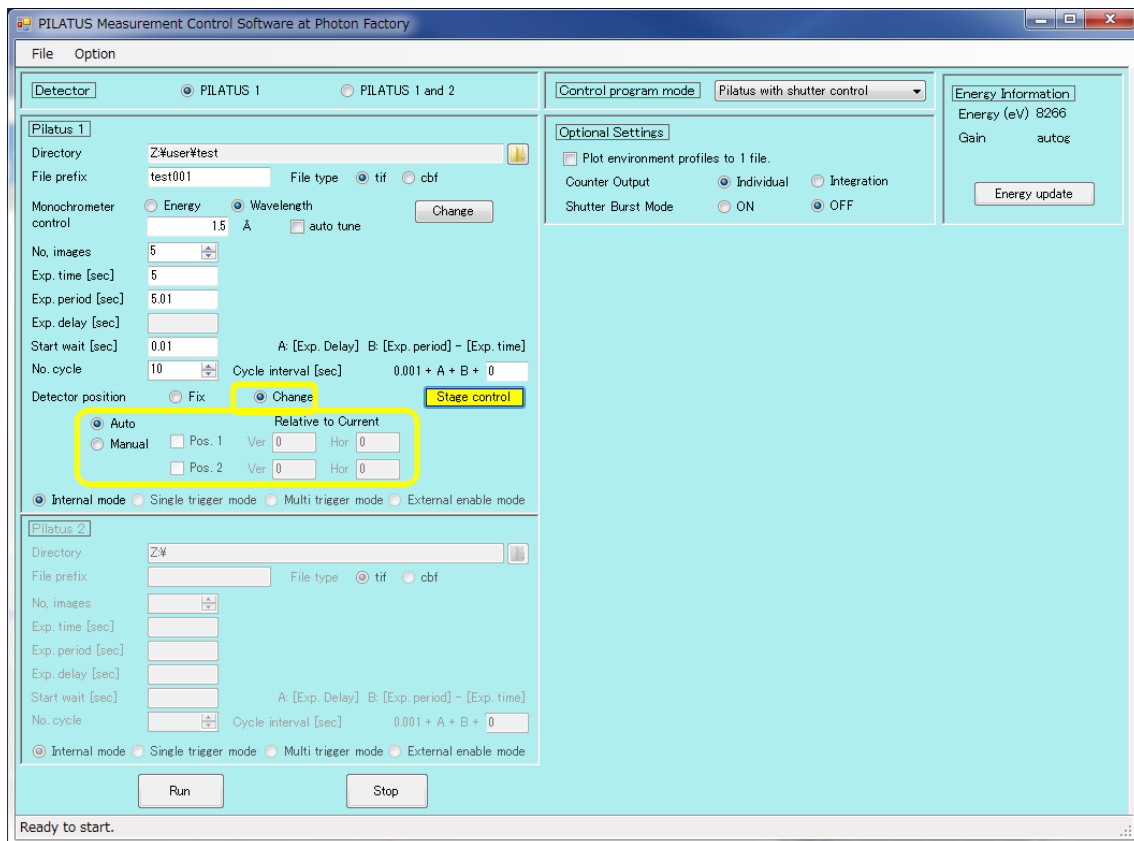
- Press "Run" to start the measurement.
- The file name will be "test001_00 (measurement position)_d0 (translation position)_00000 (number of measurements).tif" or "test001_00 (measurement position)_d0 (translation position)_00000 (number of measurements).cbf".
- The file name will be "test001_00 (measurement position)_d0 (translation position)_00000 (number of measurements).tif" or "test001_00 (measurement position)_d0 (translation position)_00000 (number of measurements).cbf".

6. Measurement while changing the wavelength.

- Normally, the wavelength or energy values of the Monochromator Scan Software and the measurement software are matched.
- When performing measurements while changing the wavelength, please click on "Change" in the measurement software.
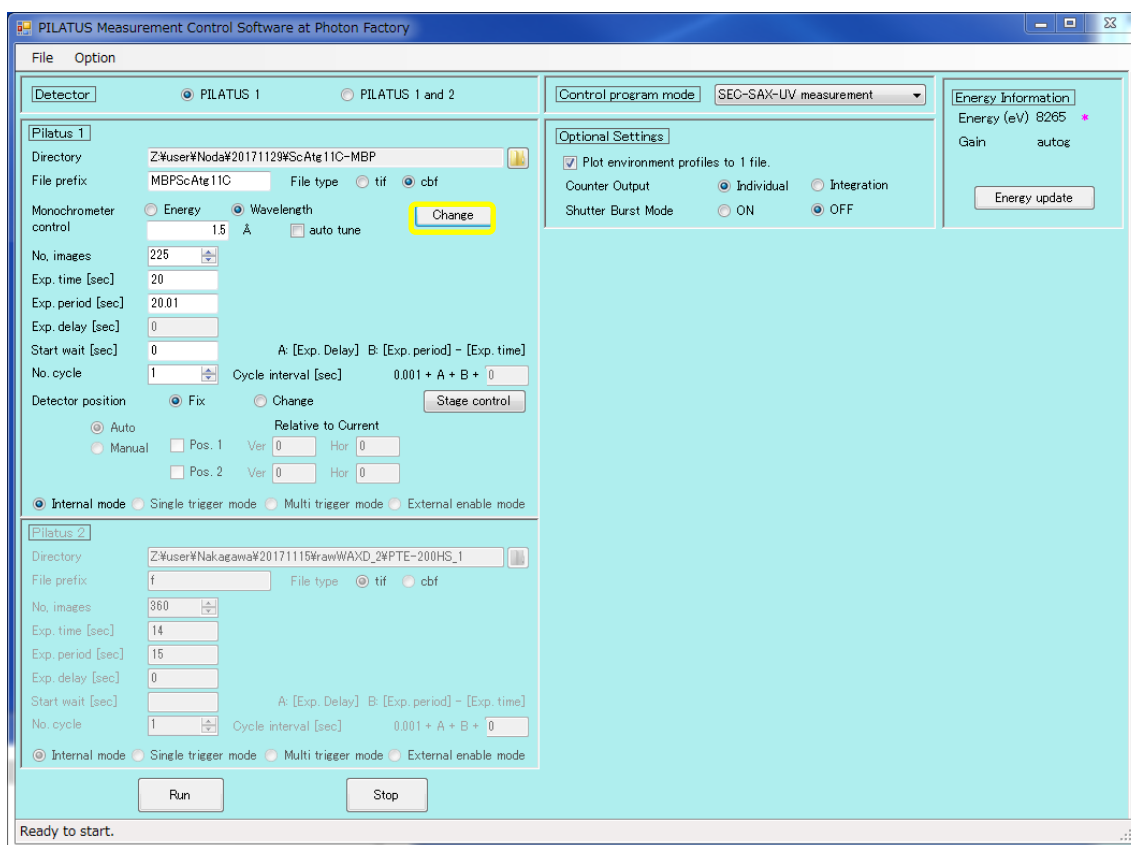
- Check the "Enable range scan" option in the Monochromator control range input, and input the desired values for changing the wavelength or energy.
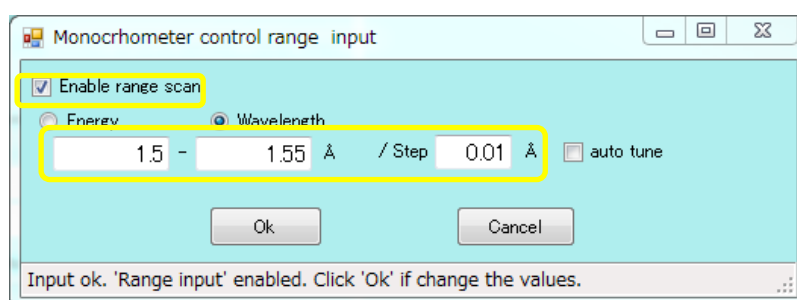
- Selecting "auto tune" will perform a dTheta scan.

7.Restart procedure.

- If an error occurs during measurement with PILATUS and image data recording is no longer functioning, please follow the steps below to restart.
- Please click on the "PILATUS manager" that is running on the taskbar of the measurement

PC.

- When the Command Prompt window opens, please click the "X" in the upper right corner
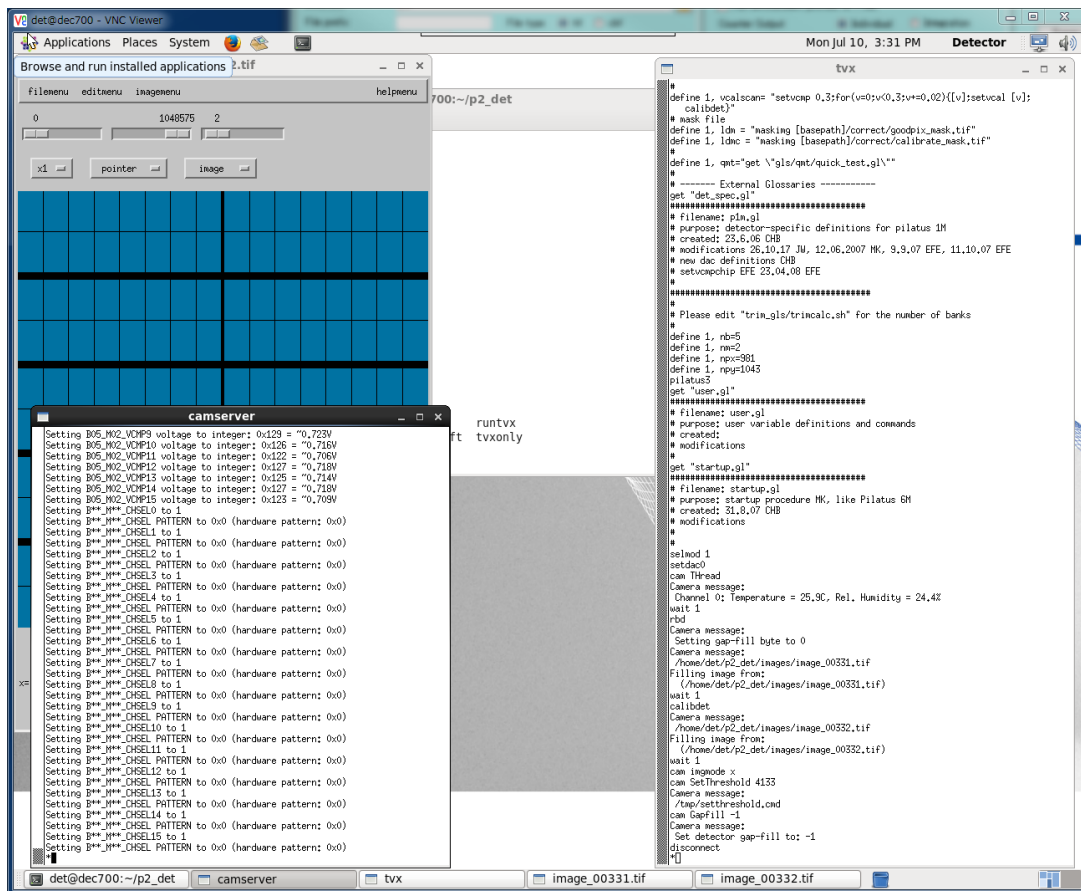to close it.
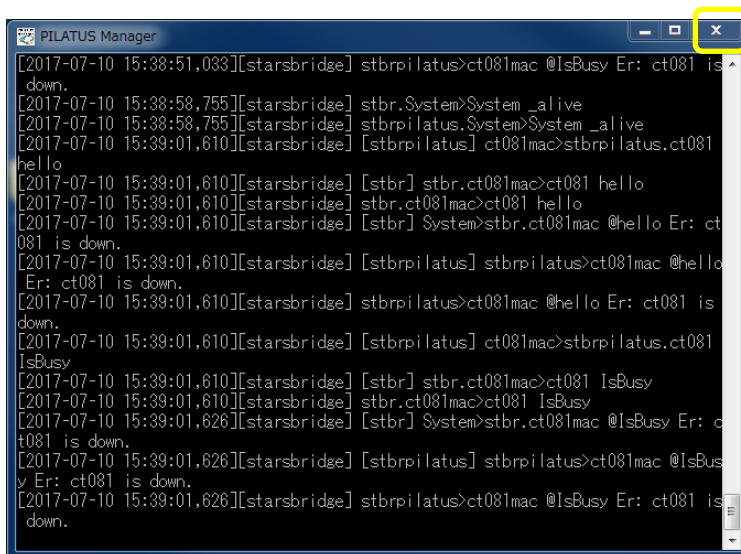
- Please click the "VNC" icon from the taskbar or desktop to launch it.

- In the case of SAXS, in the "VNC Server" field, enter either "172.16.0.4@BL-6A",
"172.16.0.71@BL-10C", or "172.16.0.2@BL-15A2". For WAXD, enter either
"172.16.0.6:1@BL-6A", "172.16.0.73@BL-10C", or "172.16.0.3@BL-15A2". Then, click
"Connect".
- The window "det@datXXX-VNC Viewer" will be launched. On the screen, you will see the
Display Window to show PILATUS images, along with two terminals for "camserver" and
"tvx," and an additional terminal running in the background.

- There is an error message displayed in the "camserver" terminal's log. (The "camserver" terminal itself might have crashed due to an error.)

- Please click the "X" in the upper right corner of the "camserver" and "tvx" terminals to close them. Also, close the Display Window for "image_000XX.tif".

- There is only one terminal remaining on the screen.

- To check the current directory, please type "ls" and press Enter.

- If the directory is not "p2_det," please type "cd p2_det" and press Enter to navigate to the "p2_det" directory.

- The last line in the terminal.

      det@detXXX:～/p2_det>

So, type "runtvx" on the keyboard and press Enter to execute it.

- When you execute "runtvx," two terminals for "camserver" and "tvx" will be launched. Eventually, the Display Window for PILATUS showing "image_000XX.tif" will also be displayed. Additionally, in the "tvx" terminal, you will see:
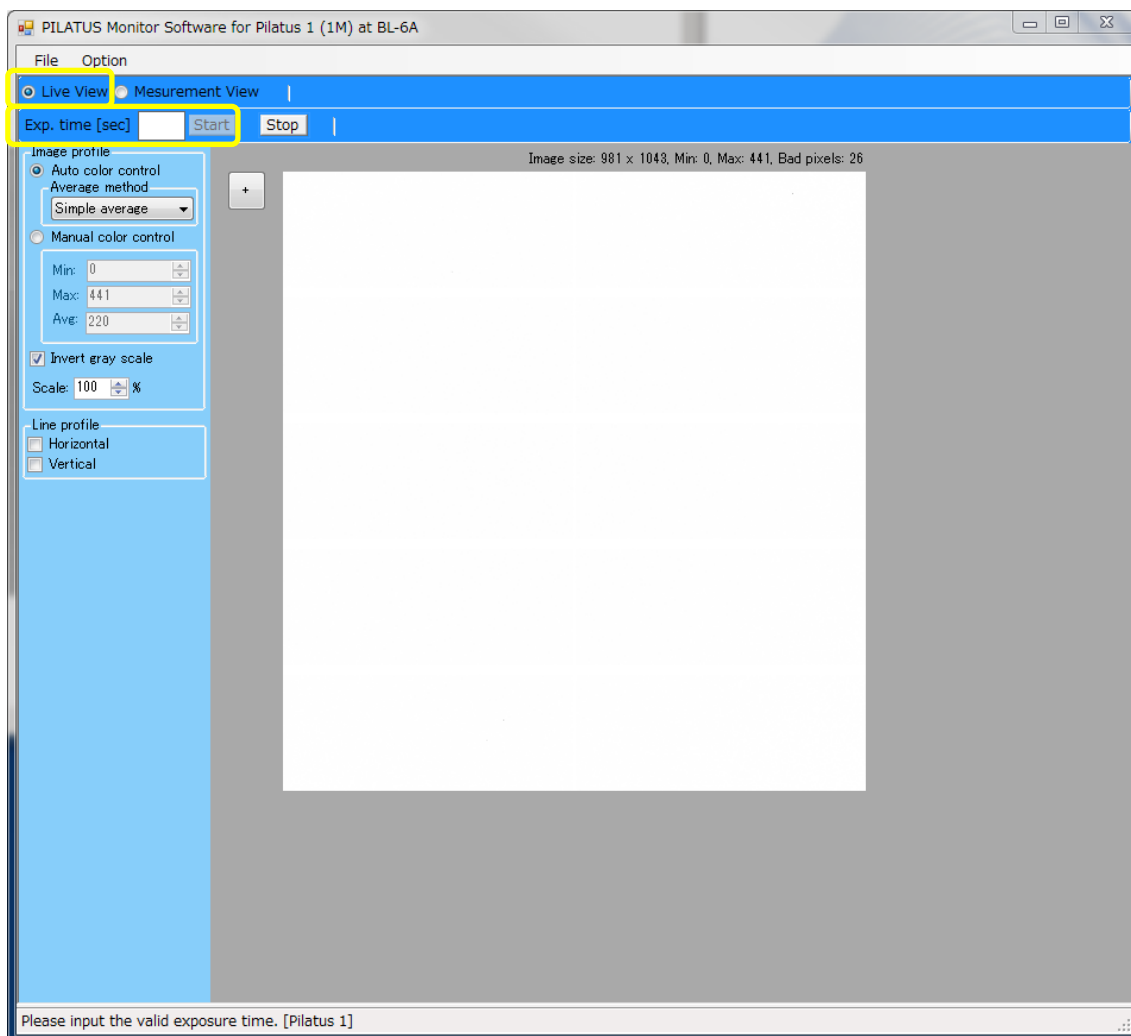
      disconnect
      *

- The restart of the server program is now complete.

- Please click on "PILATUS Manager" located on the desktop of the measurement PC to launch it. Upon launching, an icon will appear on the taskbar.

- Please confirm that you can successfully perform measurements in the PIRATUS Monitor Software by testing in Live mode with Exp.time set to 1 second and 10 seconds, among other settings.

An example of BL-6A.