Common Manual for User of ZetaView PMX120 Nanoparticle Tracking Analyzer (NTA)

This is a simplified version that focuses mainly on routine operation.
For more detailed instructions, please refer to the user manual and the technician (Ms. Crystal CHEUNG, sfcheung@hku.hk)

1. Scope

1.1 This document provides operating procedures and requirements to ZetaView PMX120 Nanoparticle Tracking Analyzer (NTA)
1.2 **Booking System:** http://store.chemistry.hku.hk:8085/.
System location: CYM 408
Primary Contact: Ms. Crystal CHEUNG
Email: sfcheung@hku.hk

CAUTION: To avoid irreversible damage of the glue holding cell and cell flange together

The use of organic solvents is discouraged.

The pH range of the cleaning solution must not exceed pH3-pH11.

The acetone content shall not exceed 20% for cleaning the cell.

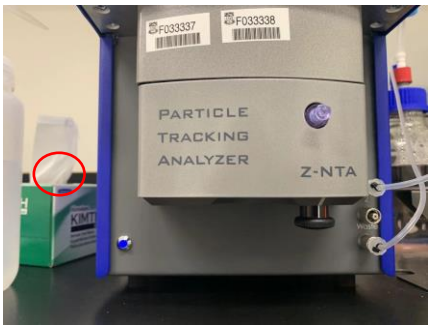
Before study the following sessions. Watch the training video on youtube.

https://www.youtube.com/watch?v=Fpv42oyagaQ&list=PL_sY_BH4vS4BddT2eSAW3b2cKGKTzjsU8

Particularly:
https://www.youtube.com/watch?v=6boCbqJtzG4&list=PL_sY_BH4vS4BddT2eSAW3b2cKGKTzjsU8&index=9

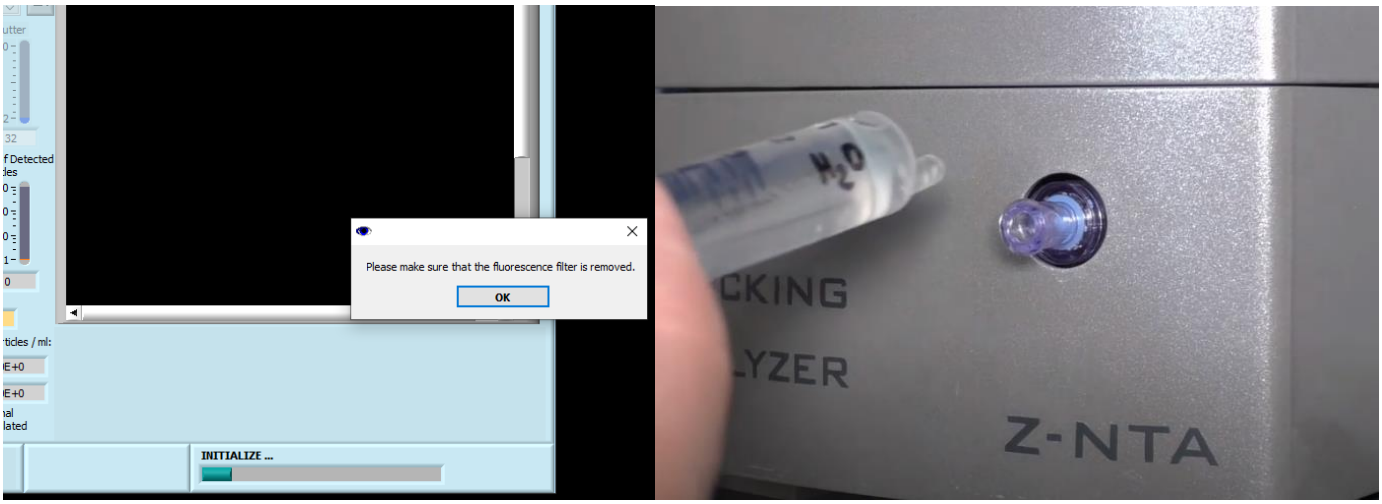
2. Calibration procedure

2.1 Turn on the computer and enter the password 123456;
2.2 Turn on the ZetaView machine;

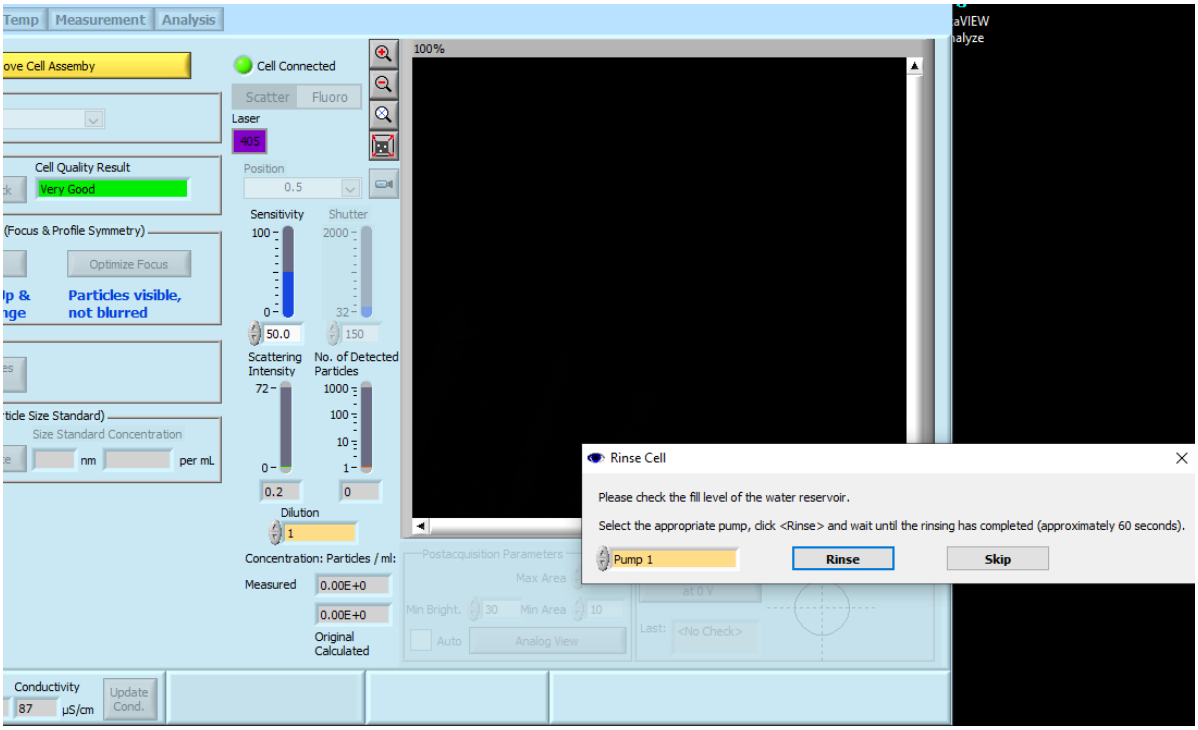


2.3 Start the ZetaView software by double clicking the ZetaView icon "Zetaview.exe" on the desktop.

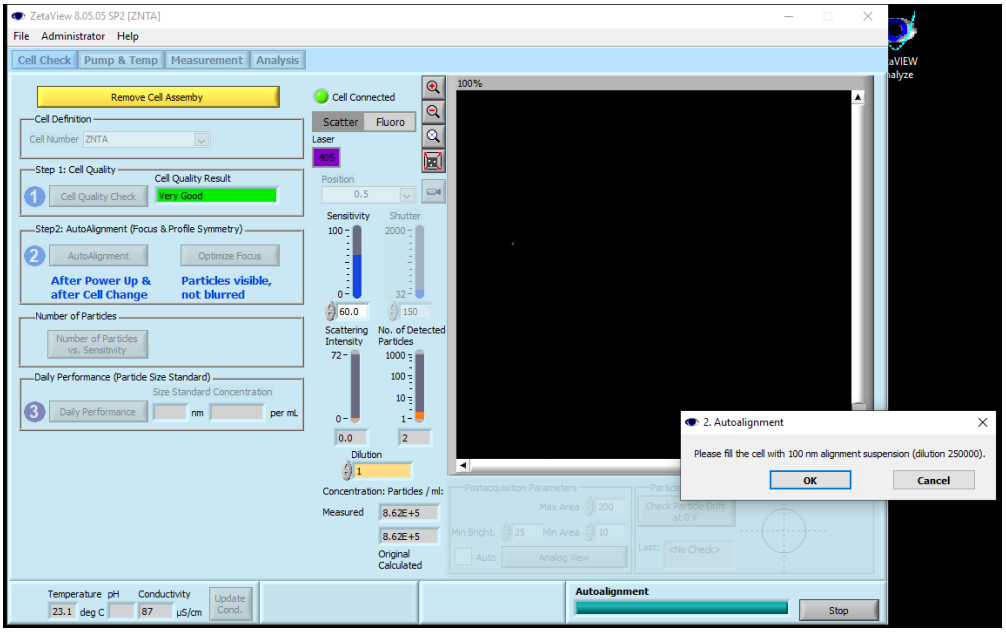
2.4 The ZetaView instrument initializes, which is visualized by the progress bar at the lower right of the window.



2.5 After initialization the message “Please check the fill level of the water reservoir” appears. Select pump 1, click Rinse. The ZetaView instrument performs a CellCheck (“Cell Quality Check in Progress”) which is visualized by the progress bar at the lower right of the window. During the pump rinsing process, inject 10-20ml water from the injection port to remove dead volume in the cell.



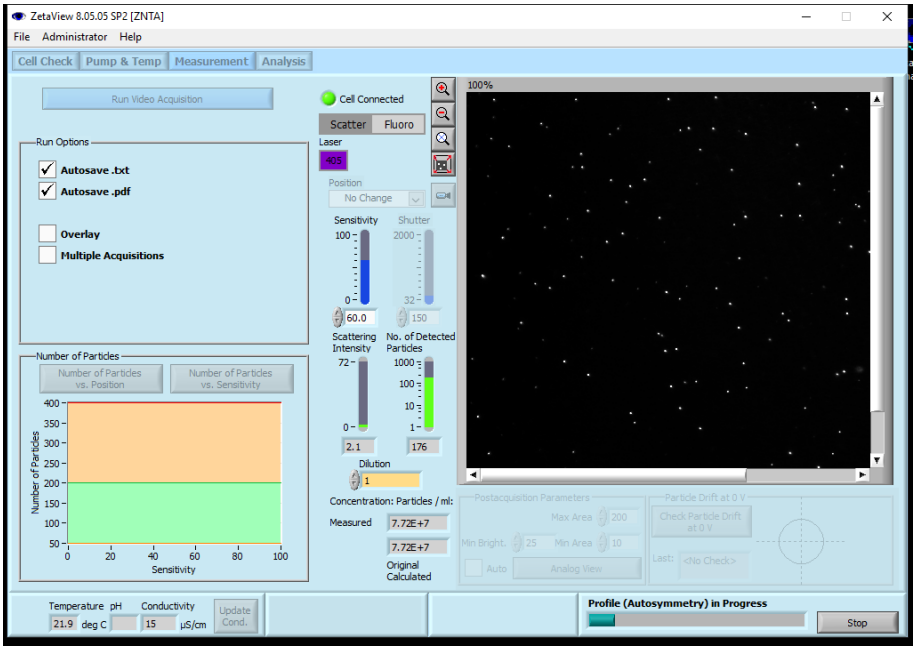
2.6 After CellCheck has passed, the message “Please fill the cell with 100 nm alignment suspension (dilution 1:250.000)” appears.



2.7 Please inject 1 ml alignment suspension and press OK. Please avoid generating air bubbles during injection.

Reminder 1: standard alignment suspension is stored in the NTA fridge, please dilute to 1: 250,000 using proper stock solution provided. Please take the alignment suspension out of the fridge 30mins before your experiment for the room temperature calibration. And store the suspension in the fridge after finished.

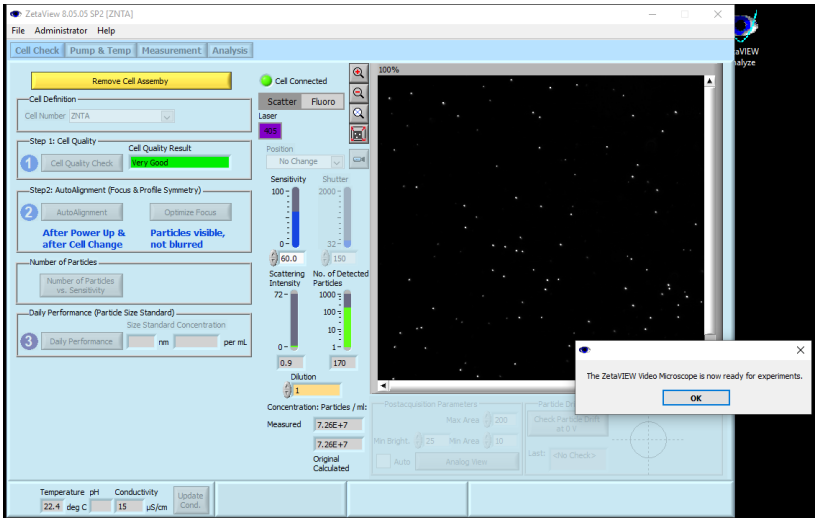
2.8 The ZetaView instrument performs an autoalignment (see progress bar) and followed by a focus optimization (see progress bar)



During autoalignment the instrument finds particles, focuses on the particles first in large steps followed by small steps and finally performs a zeta potential measurement for profile symmetrization (see below). The profile should be symmetric and smooth. If the curve is inverted, jagged or flat, there is air bubbles inside the cell, the cell must be cleaned.

Finally, a profile symmetrization is performed which results in establishment of a parabola. The parabola shows up automatically in the “Analysis” menu and indicates the cleanliness of the measurement cell in terms of absence of dirt, air bubbles and other positive charged particles that may attach on the cell walls.

After pressing OK the instrument is ready to run for measurements

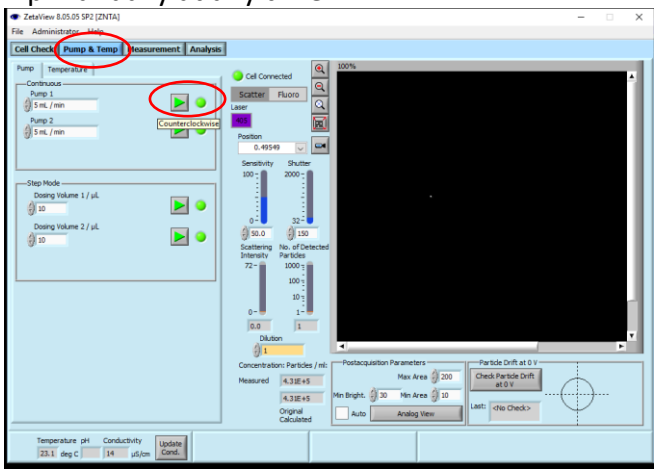


Reminder 2: The calibration process may fail and " Zetaview is not ready for experiments" will appear. Please dissemble the cell and clean the cell strictly according to the cleaning SOP attached. Common users should make sure the calibration process is OK before and after your experiment to avoid any contamination of the cell. Mark down your calibration process before & after the experiments in the Notebook. (See Cleaning SOP for the detailed process)

3. Inject the sample and microoperation

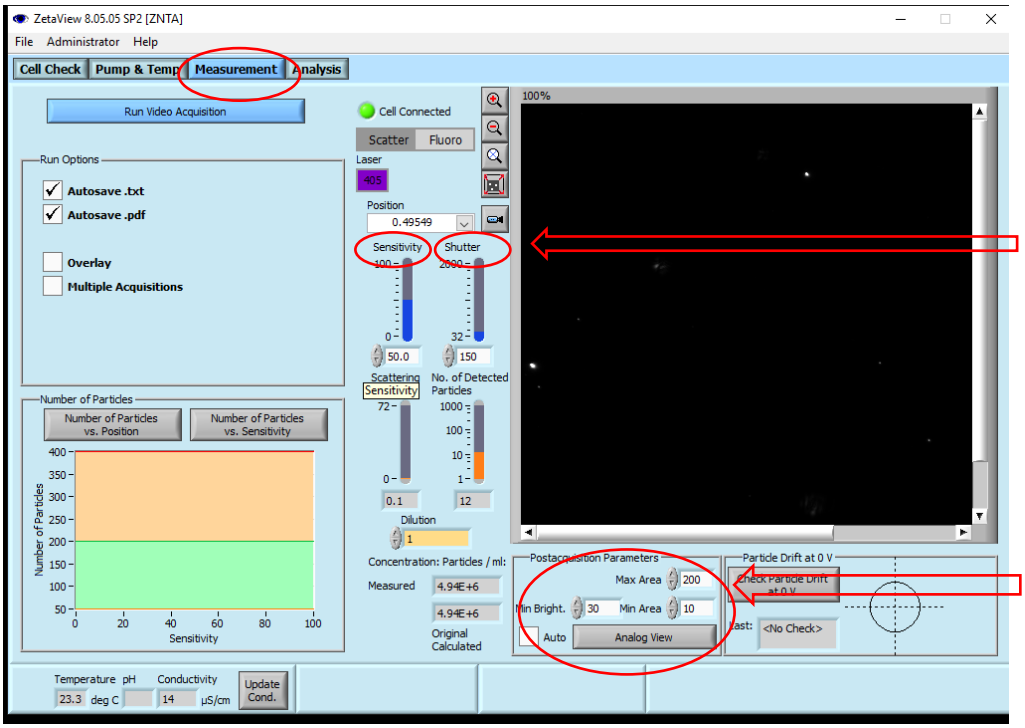
3.1 For rinsing the instrument with water or with an appropriate buffer (NaCl, PBS, etc…), turn on **pump 1** that is connected to the corresponding bottle (**liquid 1**) with which you would like to rinse the instrument.

Once the pump is activated, it will run 90 seconds until it stops automatically. However, it is possible to stop the pump manually at any time.



3.2 Inject at least 1 ml your experiment sample and avoid generating air bubbles during injection. No organic solvent is allowed in the instrument, if you would definitely need organic solvent (including mixture solvent), contact Dr. Tang for permission before use.

Click "**Measurement**" and adjust "**Sensitivity** ", "**Shutter**" according to your experiment.



Preacquisition Parameters

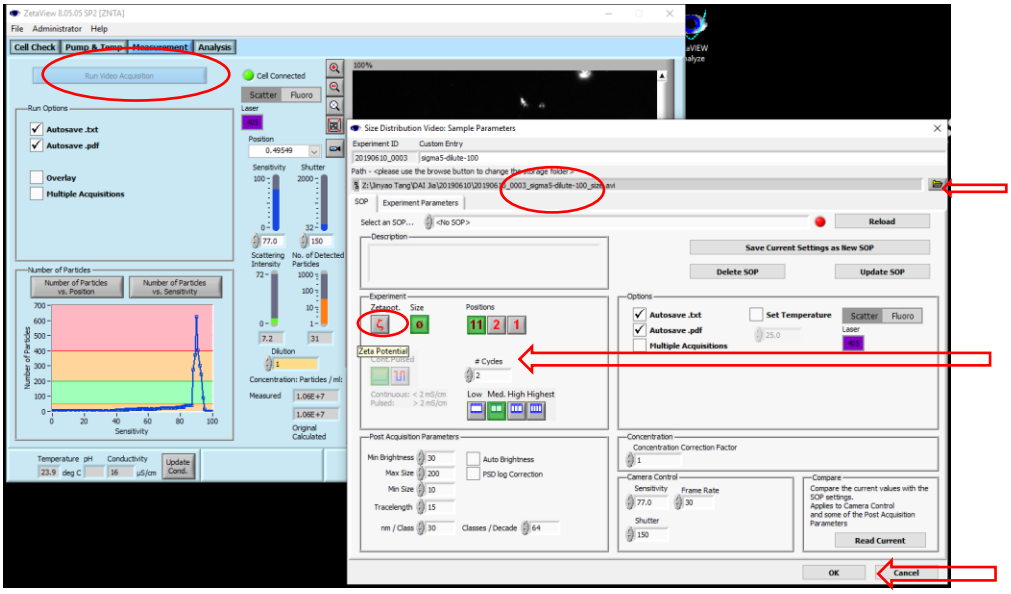
Postacquisition Parameters

In general, the sensitivity should be adjusted accordingly depending on the scattering behavior of the sample. The shutter value means adjusting the duration of the exposure time of the camera. The indicated value is reciprocal in seconds (e.g. 1/70 sec). High values mean short exposure time, low values represent long exposure times

Tab. 6-1: Summary of pre and post acquisition parameters

Parameter	PS 300 nm	PS 100 nm	PS 40 nm
Pre acquisition			
Sensitivity	65…85	72…85	85…95
Frame rate	30 fps	30 fps	30 fps
Shutter	50…60	45…55	40…50
Post acquisition			
Min Brightness	100	20	20
Max Size (pixel)	500	200	200
Min Size (pixel)	40	5	5
Number of particles			
$n_{det.}$	10-50	50-600	50-600

3.3 Click ”**run video acquisition**” , select your folder and name your file, set parameters for zeta potential or size distribution measurement.



4. Data analysis

After the measurement is completed, the software changes into the <**Analysis**> menu and starts the calculations. The progress in calculation is visualized and the graph updated. Finally the result is presented in the defined video type and settings.

5. Shutdown

5.1 Rinse the instrument with water, turn on pump 1 that is connected to the corresponding bottle (liquid 1).

5.2 Inject 10-20ml **DI water from injection port** for 3 times at least to clean the cell. Make sure the particle count is zero, if not inject more water. Record on log-book if zero count cannot be reached.

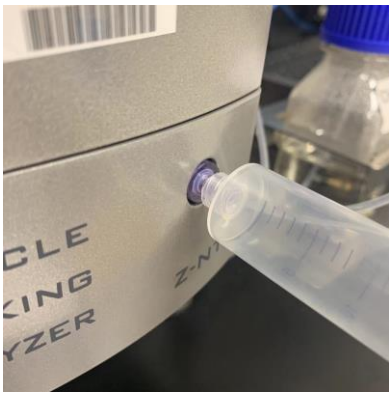
5.3 Inject 5mL **dry air** using a clean syringe for 3 times at least to dry the cell. Make sure there are bubbles generated in the waste bottle.

5.4 IMPORTANT: Turn off the program, and re-click on the "Zetaview.exe" to repeat the process with distilled water before injecting the standard sample to check the cell quality.

5.4.1 If the cell quality is in Green state, repeat process 5.3 and goes to 5.5.

5.4.2 If the cell quality is not Acceptable, go to the Cleaning SOP for the detailed process and repeat process 5.4

5.4.3 If the cell quality is not Acceptable after cleaning, please contact the technician immediately and remark on the log book.



5.5 Turn off the zetaview software and zetaview machine, turn off the computer.

5.6 Clean the desk, register in the log book.