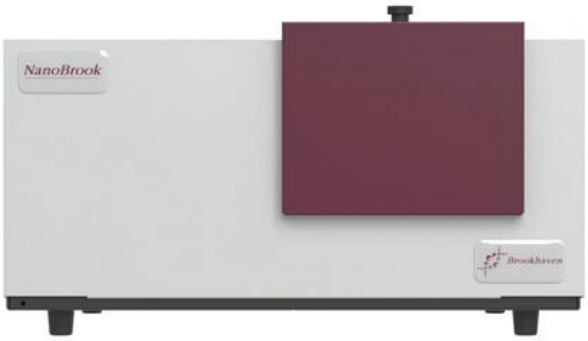
QuickStart for using goniometer software w/ a NanoBrook. Only applies to NanoBrook models with DLS capability, including but not limited to:

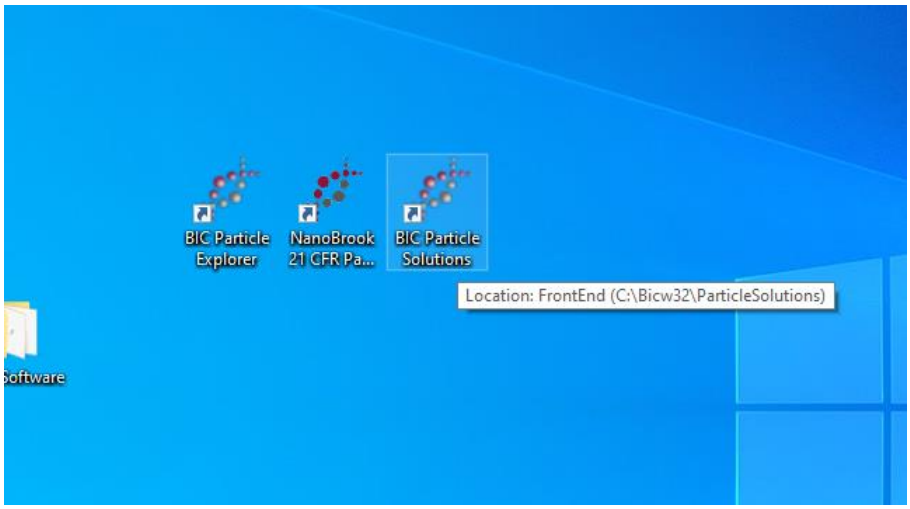
NanoBrook Omni, NanoBrook 90Plus, and NanoBrook 90Plus PALS

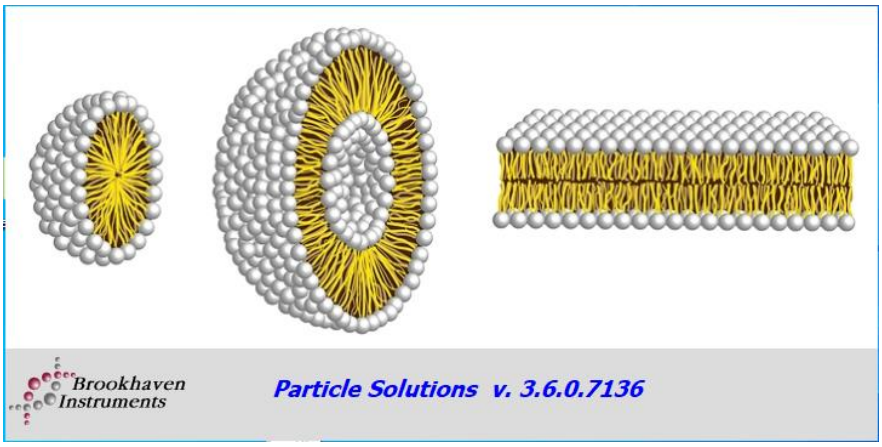
- Updated 3/23/23 for *Particle Solutions* 3.6.0.7136, and *Particle Explorer* 1.3.0.3
- This document is <u>not</u> a software manual for either application.
- The *Particle Explorer* Manual (rev 5/10/21) is also provided for reference.



Using *Particle Solutions* to enable the NanoBrook laser and set appropriate shutter(s)

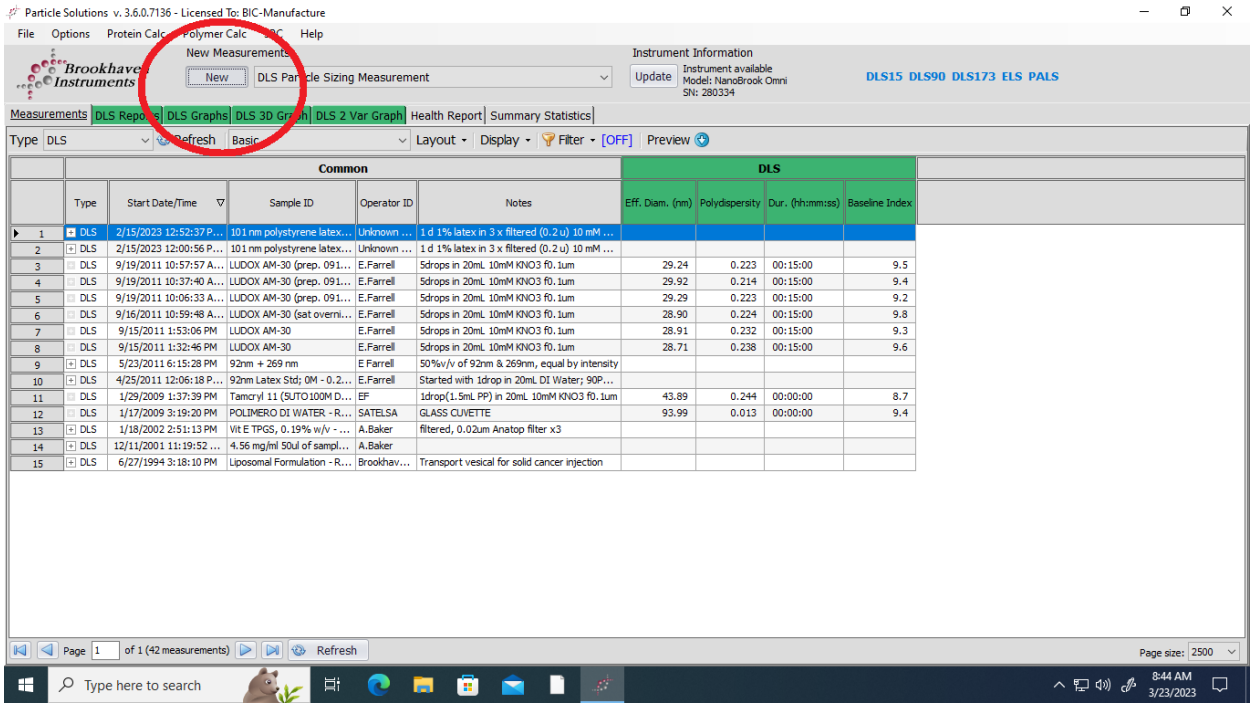
1. Open the *Particle Solutions* application



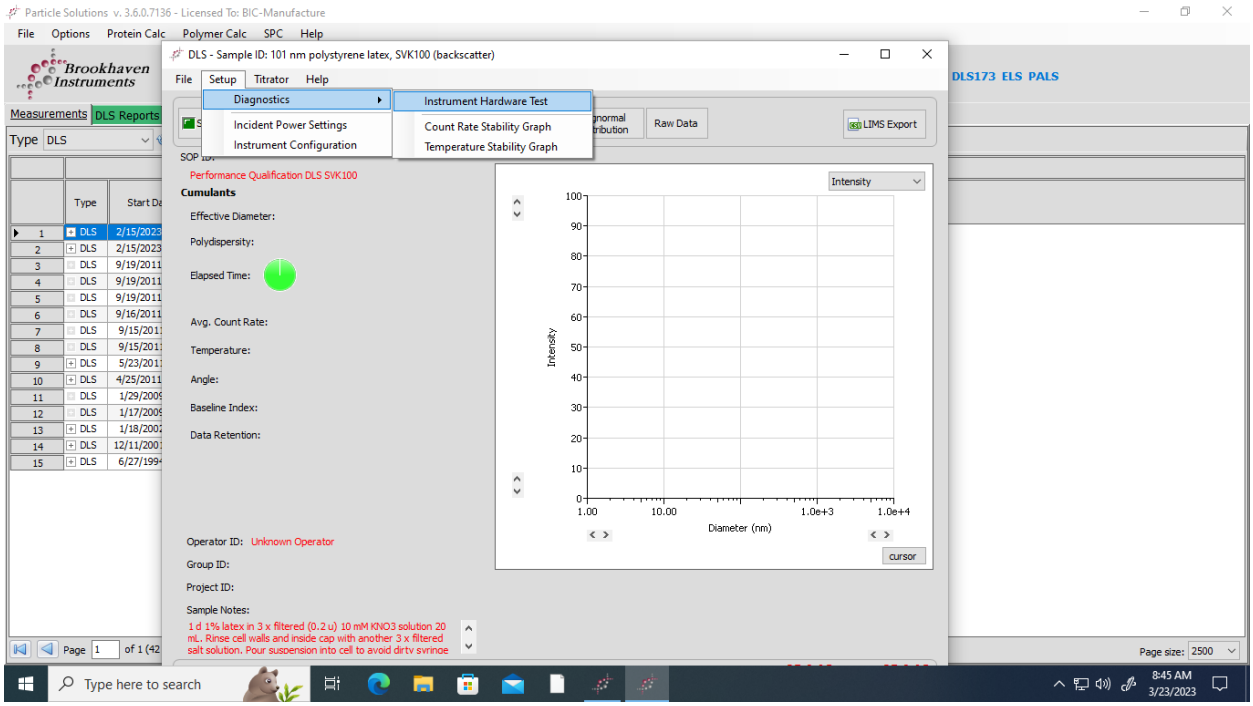


Take note of the version number displayed on the splash screen

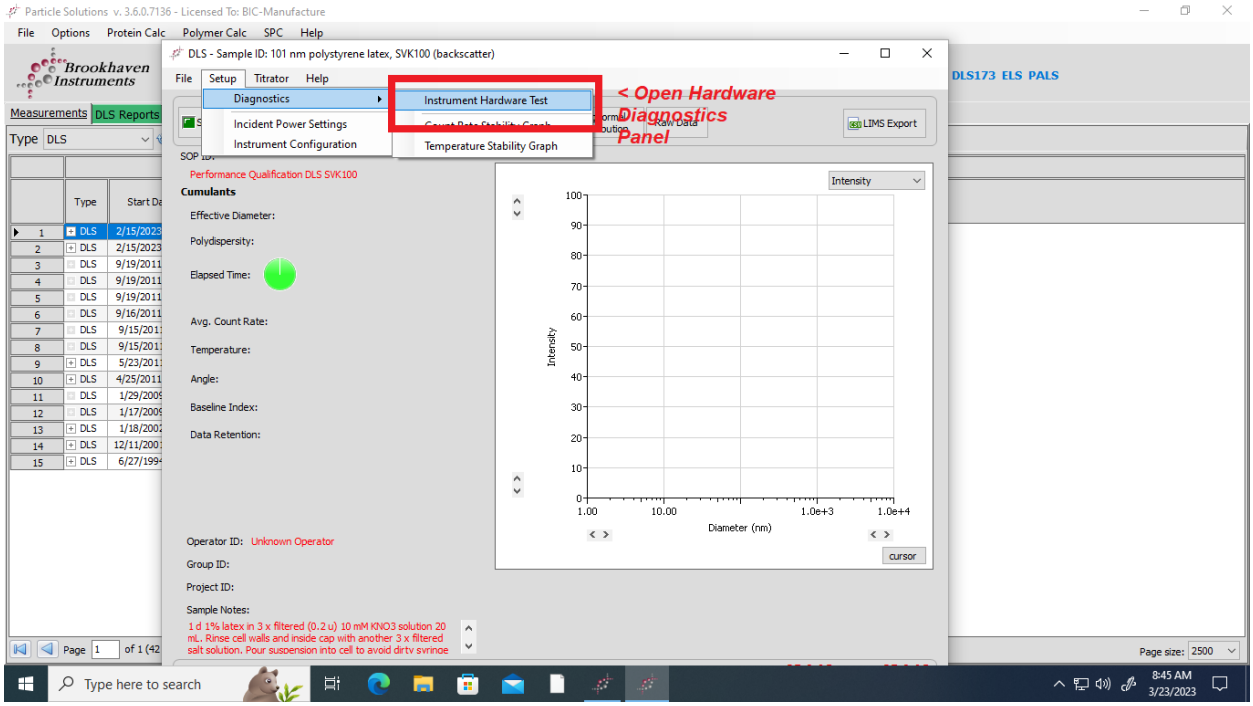
2. Click the NEW button to launch a *New Measurement* window.



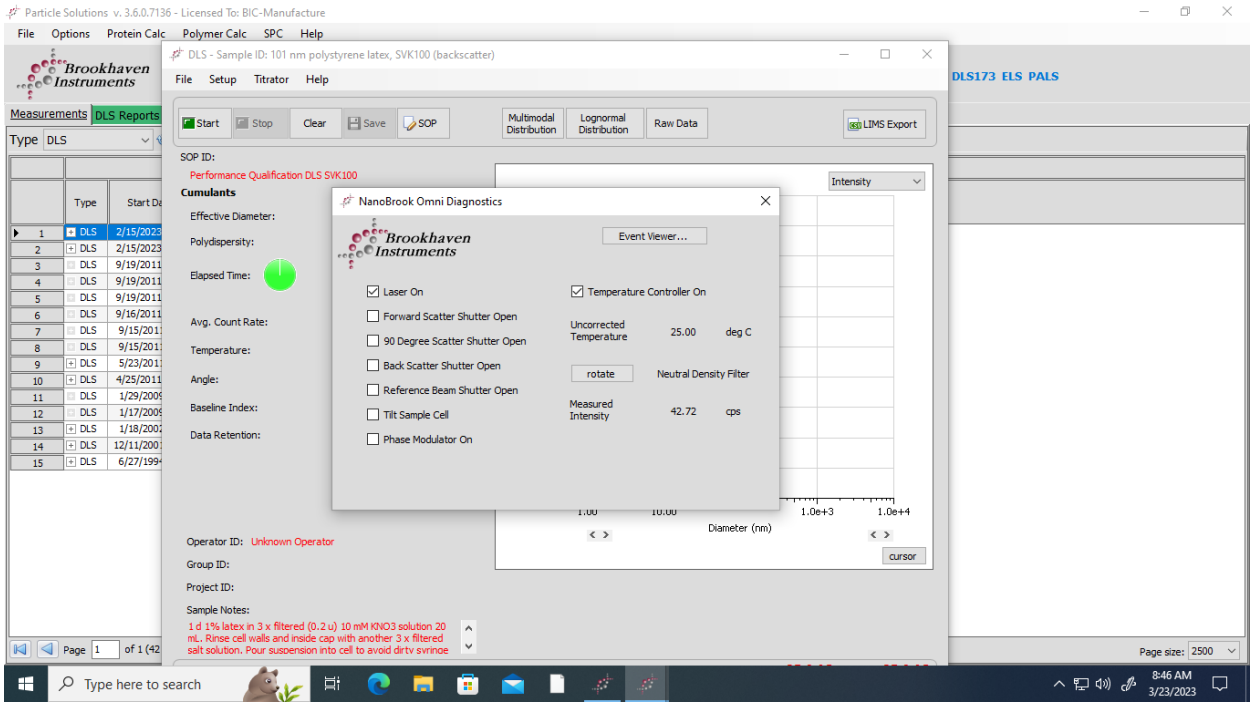
3. Once the *New Measurement* Window Opens locate the Setup tab



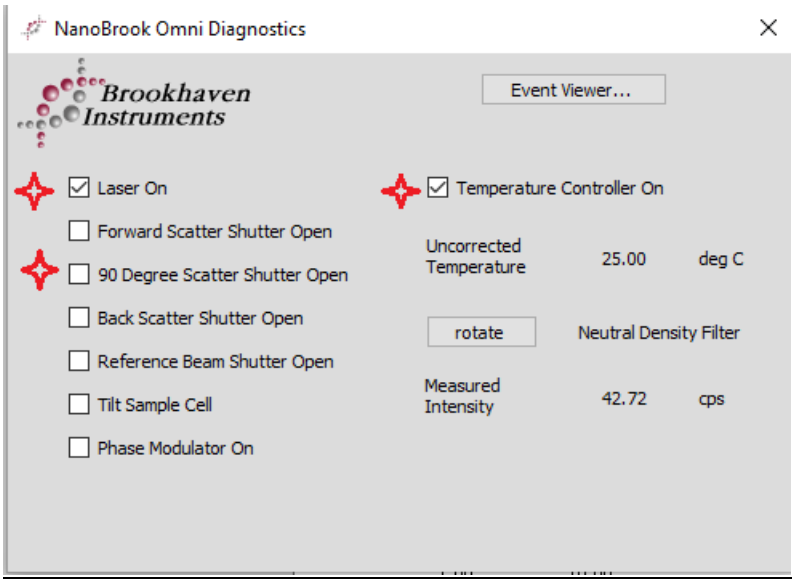
4. Open <u>Diagnostics</u> panel



5. Confirm that the *NanoBrook Diagnostics* panel is now visible

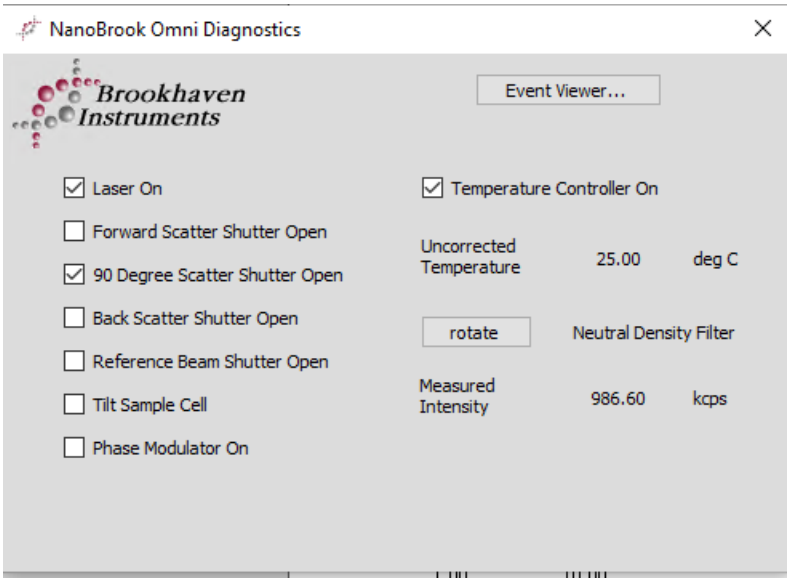


6. Power on the Laser, open <u>only</u> the 90 degree shutter, and verify that the temperature controller is enabled and holding T = 25 °C

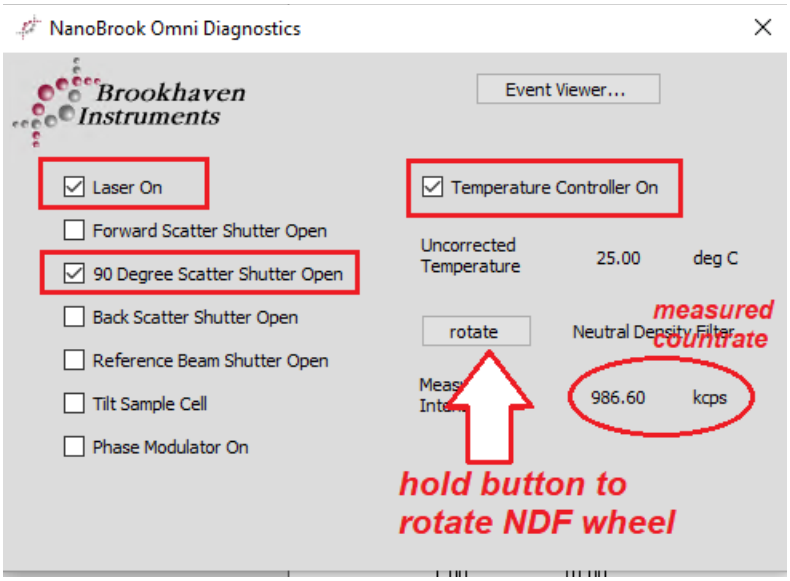


<u>Note</u> that the diagnostics panel will not allow you to override the set temperature of the oven.

7. Once the θ = 90° shutter is open, and laser is enabled, use the control panel to adjust the position of the variable NDF wheel until reaching desired countrate (usually around 500 kcps)



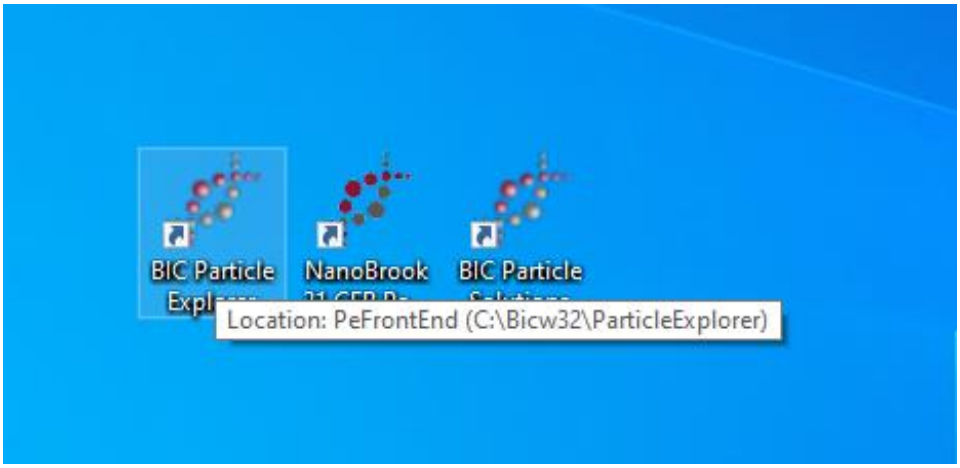
8. Confirm NanoBrook hardware is in an appropriate state, and then be sure to leave this panel <u>OPEN</u>.



9. You can move this panel off to the side of the screen to view other windows but do not exit the dialog.

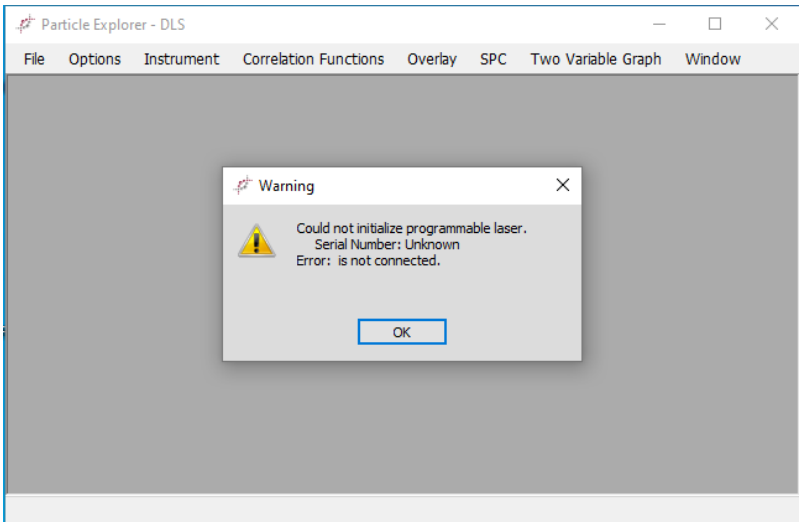
Setting up *Particle Explorer* for the first time

10. Open the *BIC Particle Explorer* front end. Make sure <u>NOT</u> to exit the *Particle Solutions* <u>NanoBrook Diagnostics panel</u> as this will release control of the laser and return shutters to closed position(s). This is critical.

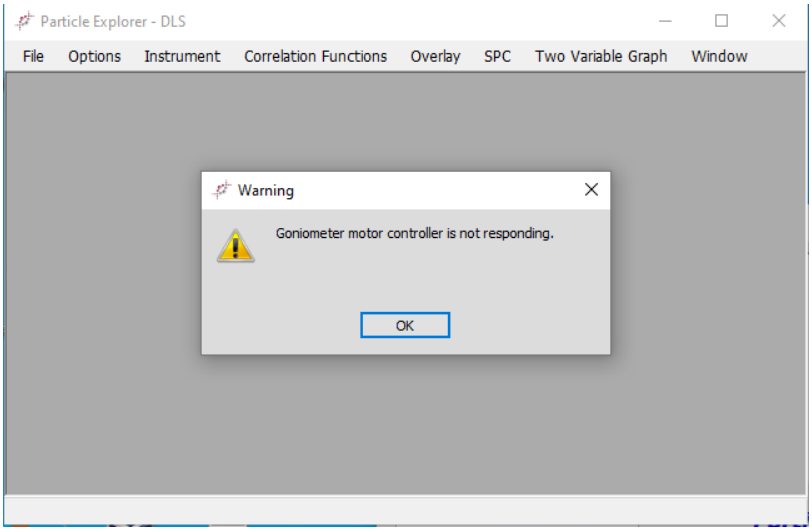


11. Confirm that the *Particle Explorer* Front End is visible, and select <u>DLS - Dynamic Light Scattering Method</u>

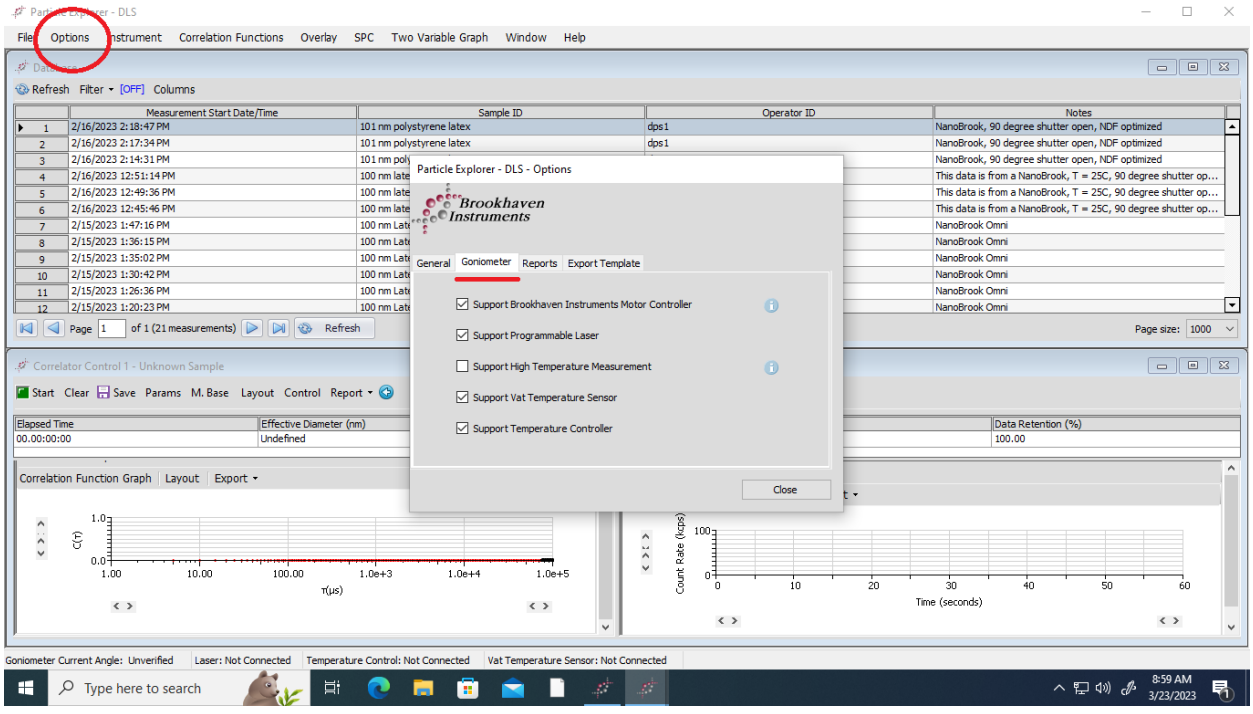
12. The first time the DLS module opens you will see a series of Warnings



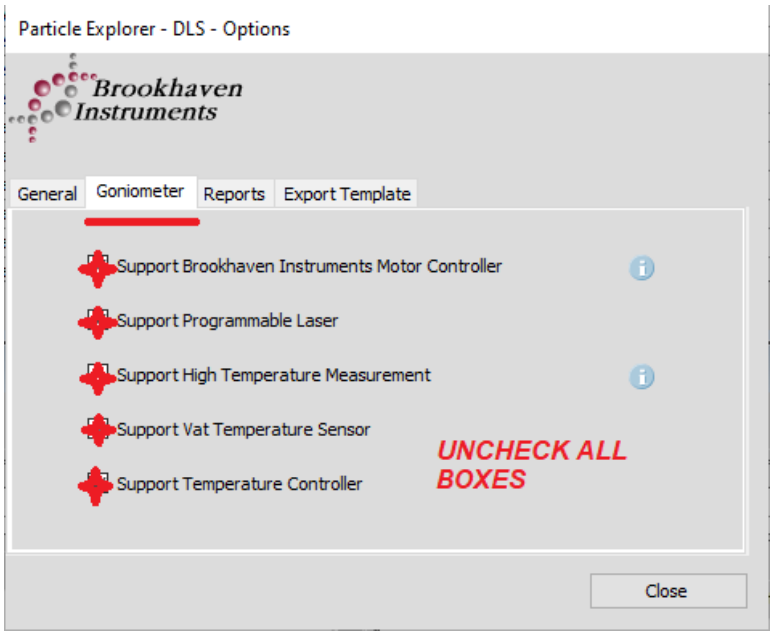
13. The first time the DLS module opens you will see a series of Warnings These will include “Could not initialize programmable laser” and “Motor Controller is not responding” you can safely dismiss these warnings (the *only* piece of NanoBrook hardware that Particle Explorer will be able to detect is the correlator).



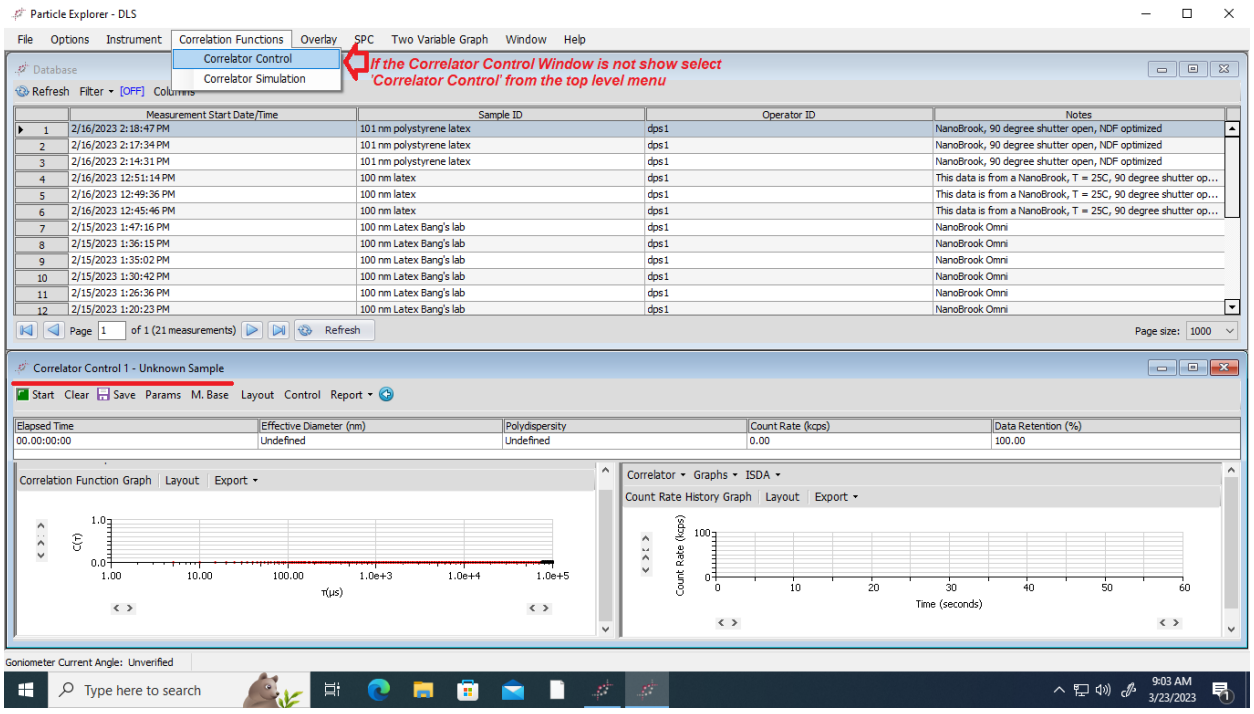
14. When the Particle Explorer DLS Measurements application opens the first time, click Options and select the *Goniometer* tab



15. **Uncheck** all boxes in the Goniometer hardware tab to prevent Particle Explorer from trying to connect to nonexistent goniometer hardware. You will no longer be shown the previous warnings when launching the Particle Explorer DLS software.

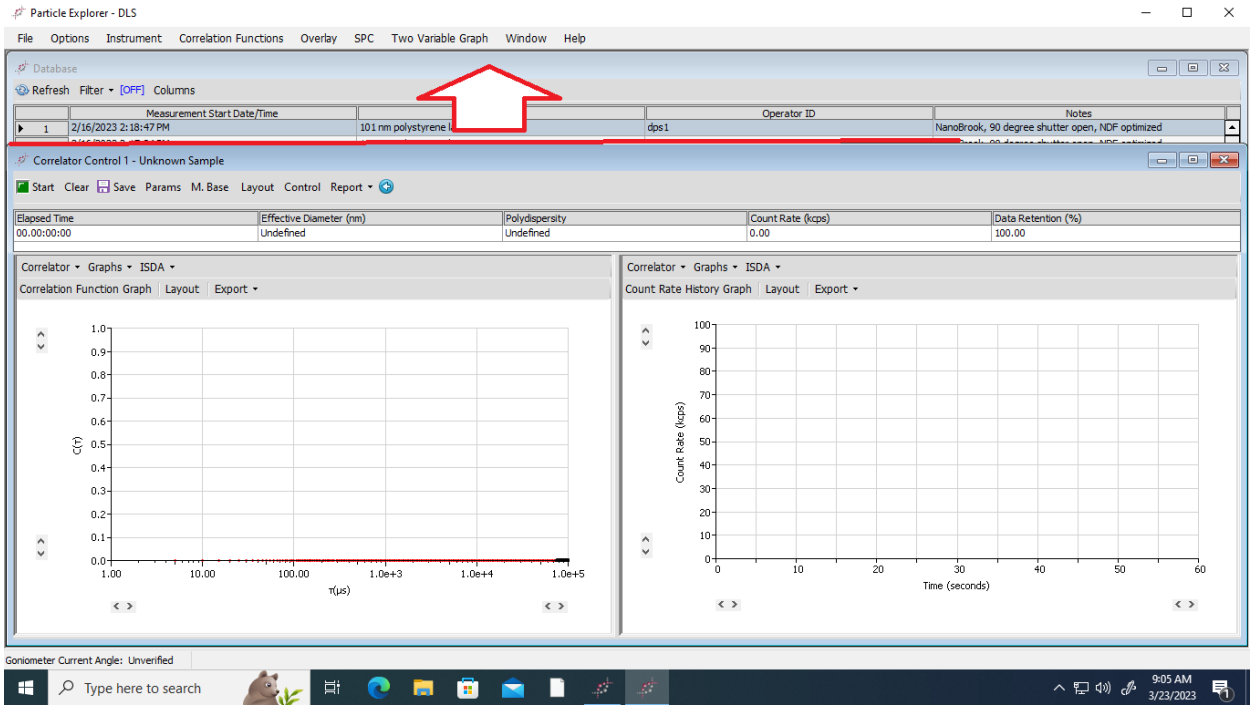


16. Make sure a new *Correlator Control* window is visible at the bottom of the screen. If not, open one using the top level menu (as shown below).

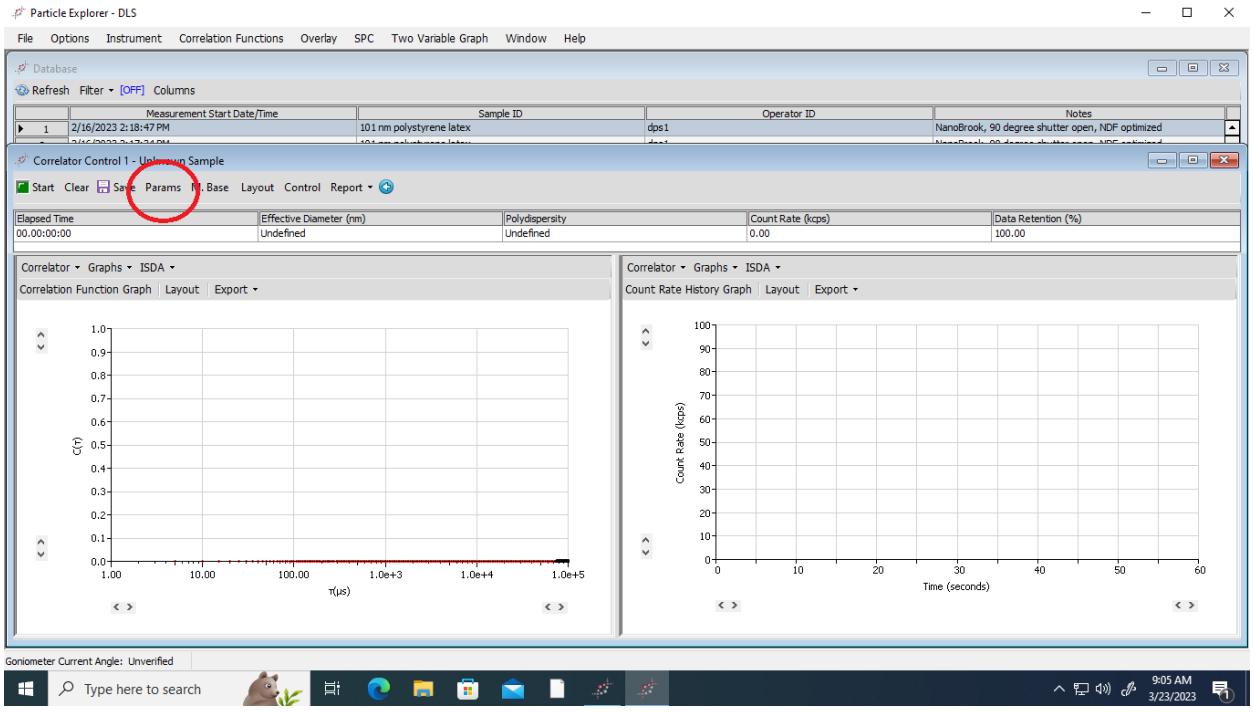


Making a new DLS measurement using Particle Explorer

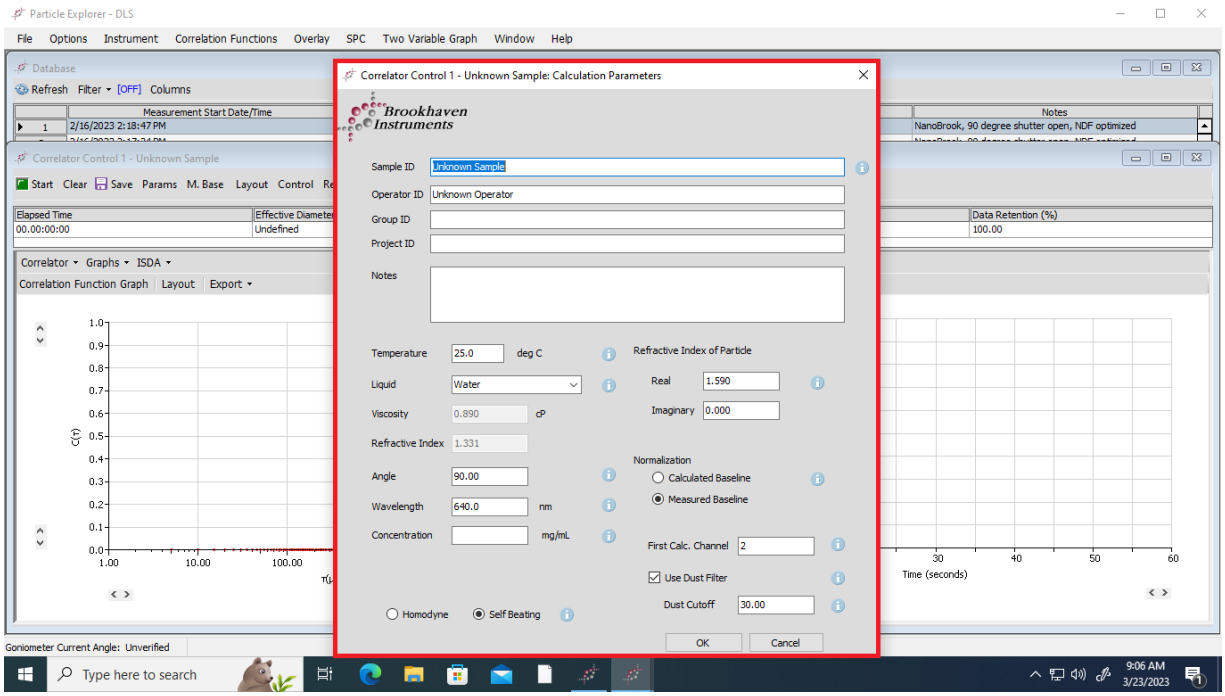
17. Drag the *Correlator Control* window up to expand



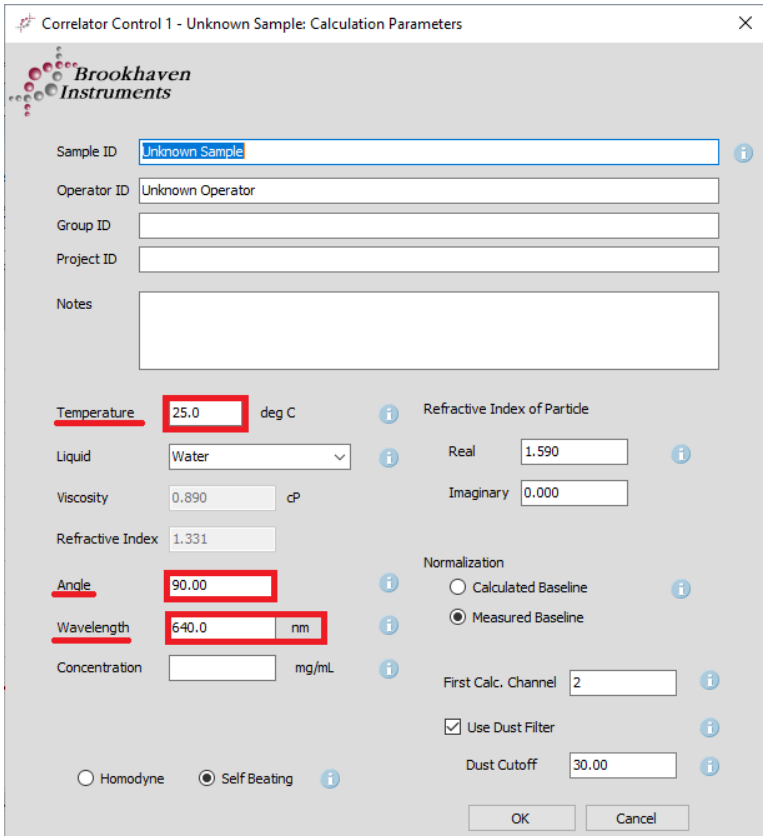
18. Click Params to enter the *Sample Parameters* dialog



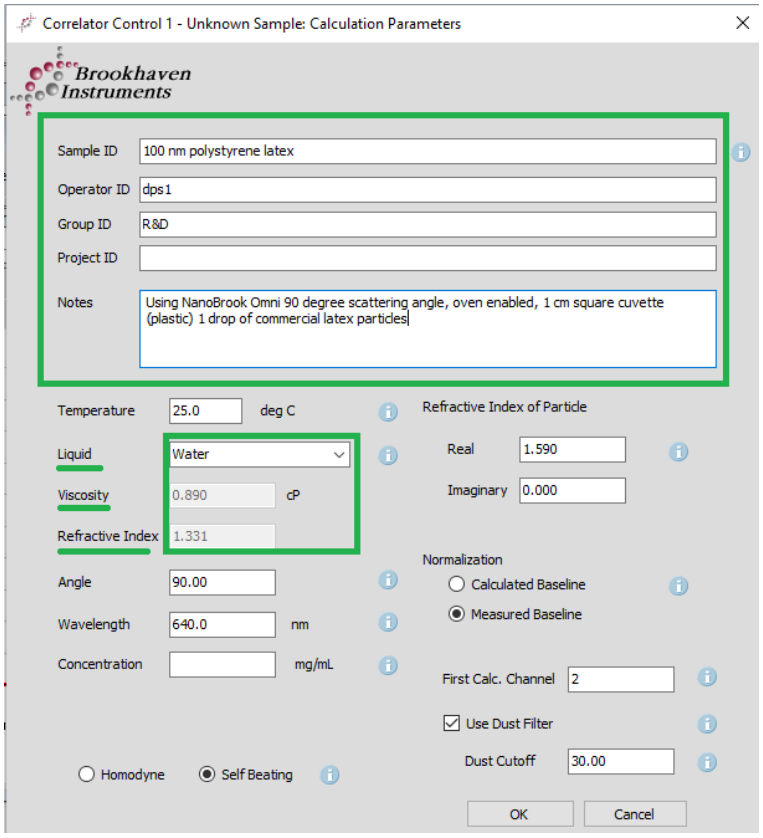
19. The *Sample Parameters* window should appear. Unless otherwise specified, the NanoBrook should have a 640 nm red diode laser, *Particle Explorer* has no direct connection to the NanoBrook laser and thus cannot automatically detect the appropriate wavelength.



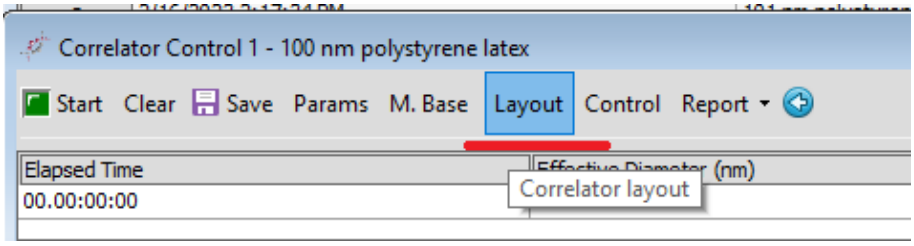
20. Note. Temperature, Scattering Angle, and Wavelength are all properties of the NanoBrook Hardware (*Particle Explorer* cannot read these in automatically). Make sure these match the values shown in the *Particle Solutions* NanoBrook Hardware Diagnostics panel.



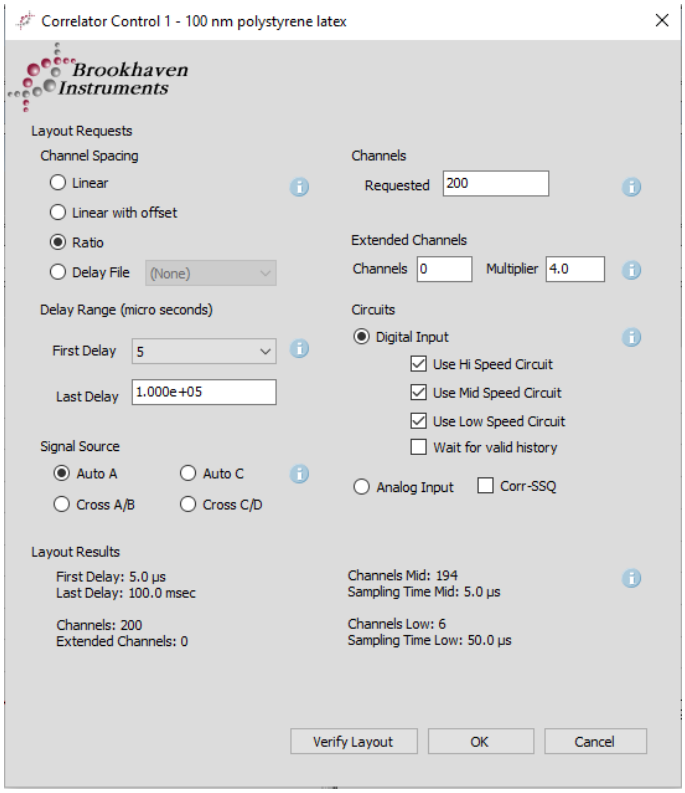
21. Enter Sample Information. Unlike *Particle Solutions*, *Particle Explorer* does not use measurement SOPs to manage settings.



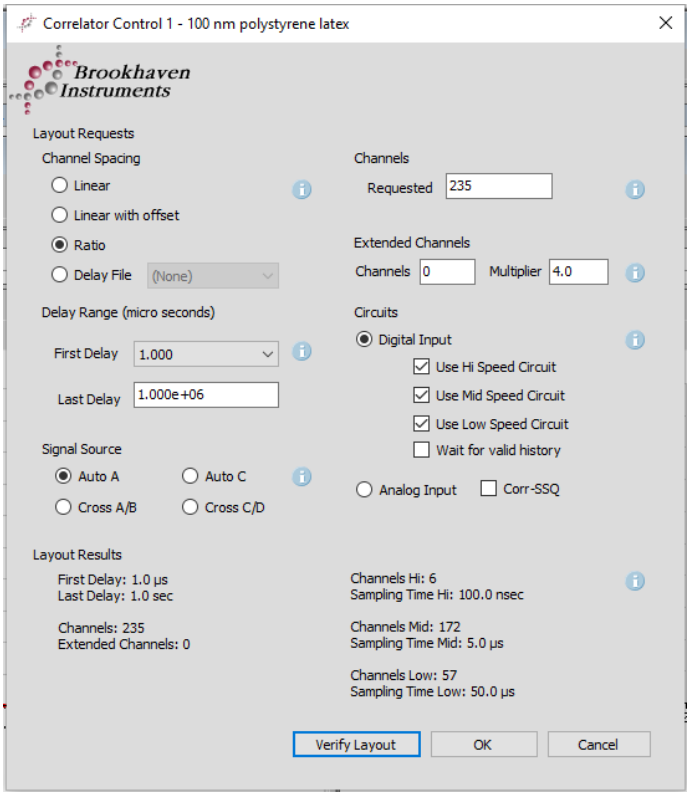
22. Return to the *Correlator Control* Window and Select <u>Layout</u> to modify the Correlator Layout



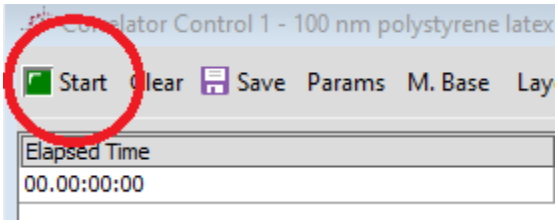
23. Note the fastest *first delay* time available on the Nano Brook Correlator is τ = 100 ns (0.1 μs), also note the signal cable for the APD is always connected to *Channel A* on a NanoBrook, so you should only ever use <u>Auto A</u> as a signal source.



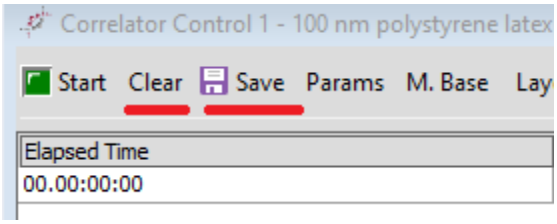
24. Update the correlator layout as desired, Click Verify Layout, and then hit **OK** to accept the new correlator layout. Refer to the full Particle Explorer manual for advanced options.



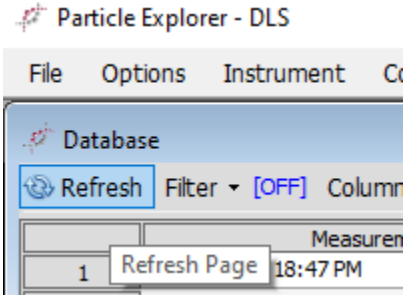
25. Click START button in the *Correlator Control* window to begin your measurement



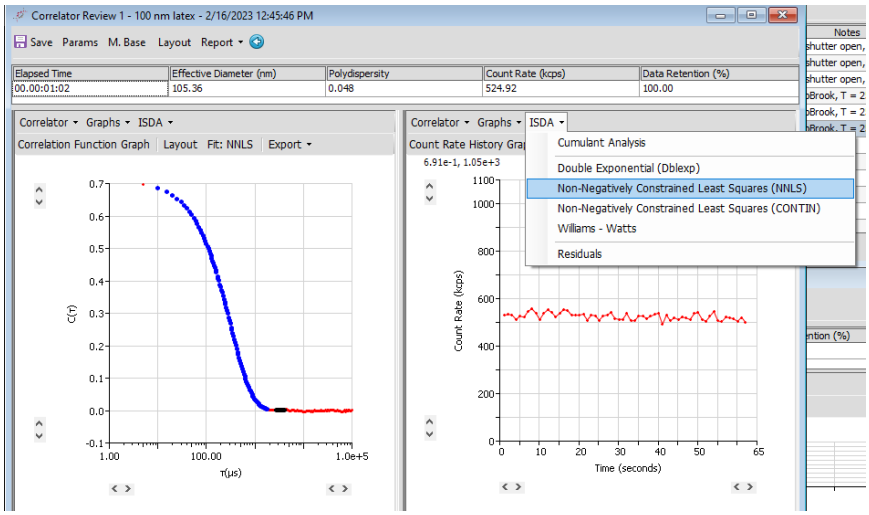
26. When measurement is complete click Save if necessary (if, for example measurement is stopped prematurely), and then Clear to reset the measurement window (otherwise new data will be added to the *current* correlation function).

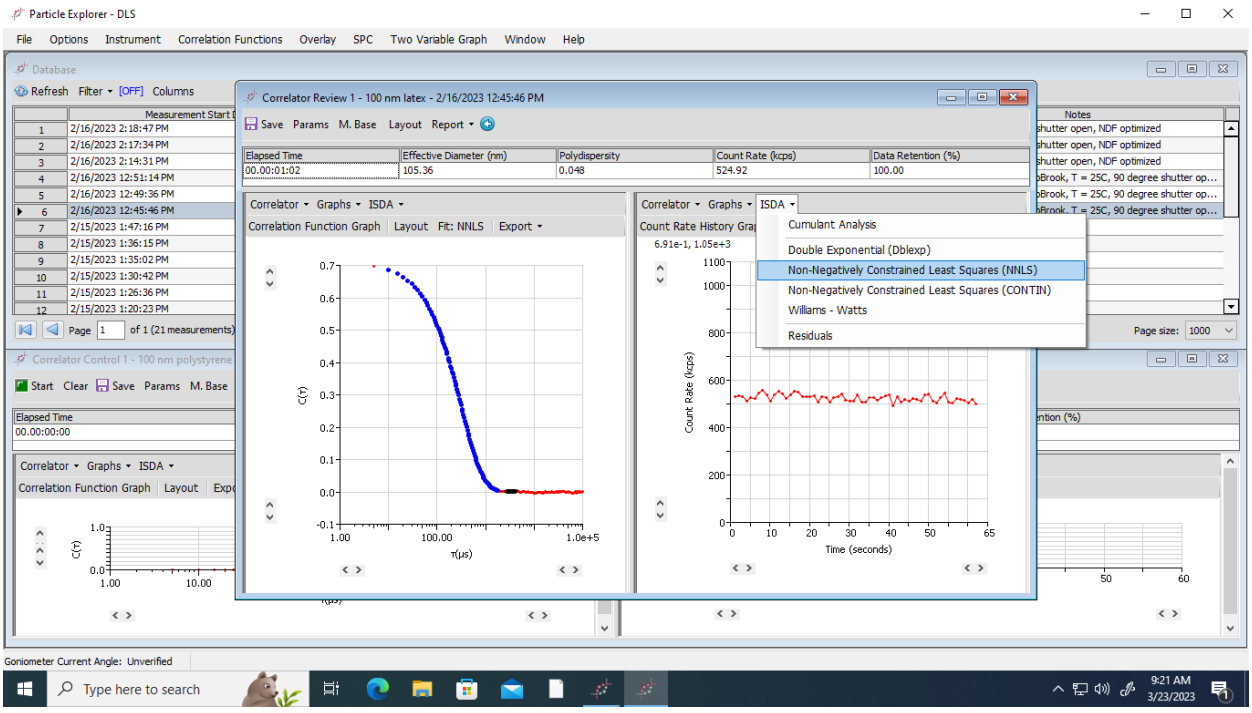


27. Click ***Refresh*** to display new measurement data



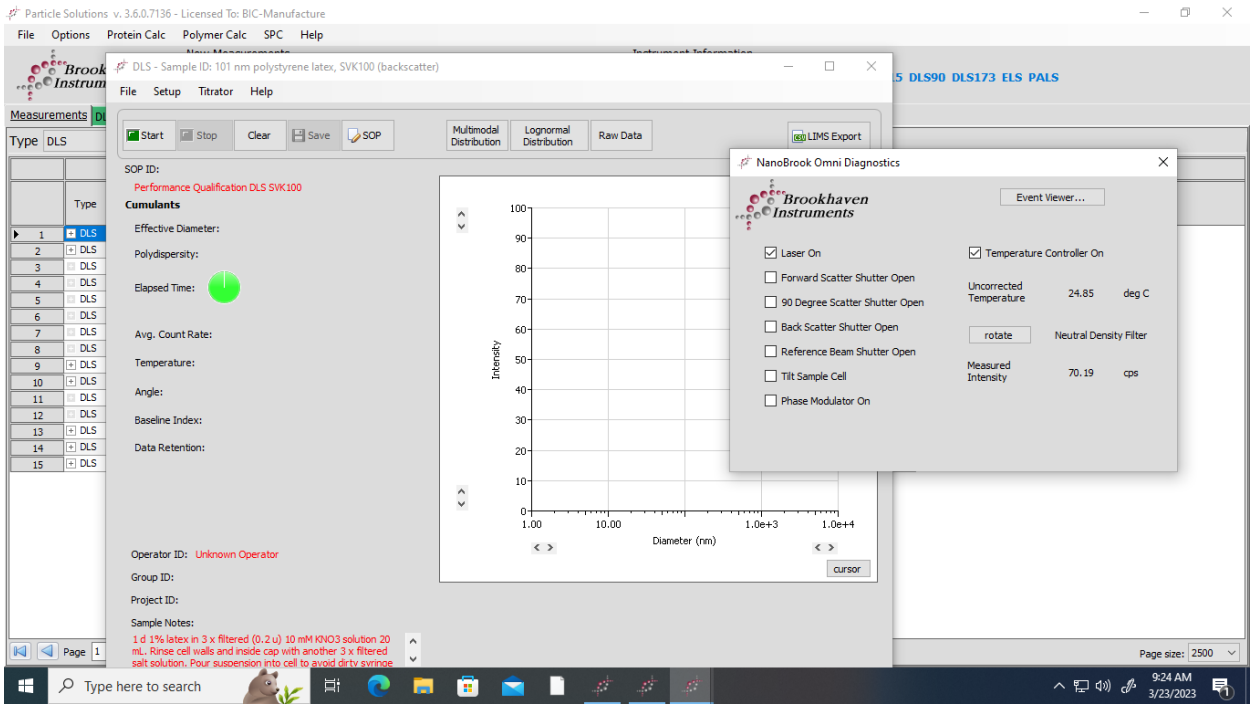
28. All standard Particle Explorer DLS Review Options should be available. Refer to the full Particle Explorer manual for advanced fitting options.



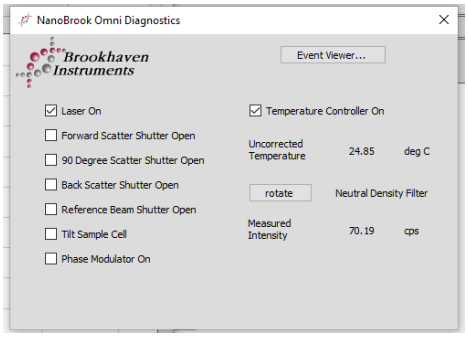


Releasing the NanoBrook hardware

29. Once finished making/reviewing measurements you can exit both the *Particle Explorer* DLS module, as well as the *Particle Explorer* frontend.
30. Finally, return to the *Particle Solutions* NanoBrook Diagnostic Panel, and *Exit* to release NanoBrook hardware and power down laser.



All shutters return to their default configurations once released. Note when shutters are closed, detector should show only darkcounts (typically < 100 cps depending on the age/type of APD)



31. Finally, confirm that laser is disengaged (powered off) and all *Particle Solutions* windows are closed.

NOTE. *Particle Explorer* is designed to operate a light scattering goniometer (the BI-200SM) and as such will have some limitations when being used with a NanoBrook. Also note, currently only 90 degree scattering angles are supported since the range of physically accessible scattering angles on our goniometer is limited to $\theta = 8, 155^{o}$. The DLS section of the standard Particle Explorer software manual can be used for supplemental information. The SLS, ZP, and IST modules have no corresponding use with the NanoBrook platform.