DYNAMIC LIGHT SCATTERING

Features of the DLS SOP:
From the bottom of the SOP Window, users have the option to "Load" a previous SOP. For DLS measurements, the option list on the left hand side is as follows:

- Identification
- Instrument Parameters
- Measurement
  - Parameters
  - Automation
    - Time Dependent
    - Temperature Dependent
- Titration
  - Setup
  - pH Titration Measurement
  - Additive Titration Measurement
- Sample Parameters
  - Liquid
  - Particle
- Data Analysis
  - Normalization
  - Size Distribution
  - MW Analysis

Of the items above, the ***options which must always be specified*** are:

1) **Identification**, in which the user sets the **Sample ID** and inputs any notes to accompany the saved data.
2) **Measurement → Parameters**, in which the user sets the **Duration** of each run. A typical value is 30 seconds.
3) **Measurement → Automation → Time Dependent**, in which the users sets the number of **Total Measurements**, as well as the **Time Interval Between Measurements**, which is typically 0 unless a time course is required. The interval is the number of seconds between the end of one measurement and the beginning of the next.
4) **Sample Parameters → Liquid**, in which the dispersing fluid is specified. The default solvent is **Water**, and the dropdown menu contains several common solvents. If the solvent information is missing, the user must select **Unspecified** in the dropdown menu and input the solvent Viscosity and Refractive Index in order to obtain meaningful data.

Other options include:

1) **Instrument Parameters** allows the user to select the standard 90^0 measurement, or switch to forward scattering (15^0) or backscattering (173^0).

Backscattering is recommended to measure small particles, especially when trace amounts of larger particles might be present.

2) **Measurement → Automation → Temperature Dependent** allows the user to specify Starting and Final Temperatures, as well as the Temperature Increment. Note that the Total Measurements requested in Item 3 above will be made for each temperature in the automation series.
3) **Data Analysis → Normalization** defaults to an Automatic calculation, but can be switched to Last Channels if even the largest particles or aggregates are to measured. Last Channels is also the recommended option for samples which exhibit two decays in the Raw Data Correlation Function.
4) **Data Analysis → Size Distribution** defaults to NNLS, but can also be switched to CONTIN. The choice of method here is reflected in the Multimodal Distribution displayed in the Measurement Window. These options can be toggled even after the data has been collected.

Note: Titration instructions are contained in a separate section below.

Upon completion of specifying your SOP, you may either "Save" to overwrite or "Save As," and then click "OK," which closes the SOP window and returns to the Measurement Window. ***It is recommended that you include your name or NetID in the name of your SOP.***

Preparation of DLS sample

Place between 2-4 mL volume of sample into a square plastic cuvette, and insert into the sample chamber. The precise sample volume is unimportant. Plastic covers are available for the plastic cuvettes. Close the top cover of the chamber when the sample is in place. **IMPORTANT NOTE**: For non-aqueous samples, use the square glass cuvettes. ***Glass cuvettes are not disposable***; be careful using them and clean them for the next user.

Begin measurement in the DLS Measurement Window:

Once the sample is in the sample chamber, select "Start" in the upper left hand corner of the Measurement Window. The instrument will equilibrate the sample chamber temperature, adjust the incident laser intensity, and begin measurements.

Data Display in Measurement Window:

Above the plotting window are options to display either Multimodal Distribution, Lognormal Distribution, or Raw Data. The Raw Data option displays both the Correlation Function C(t) and the Count Rate in kcps as a function of time. The Multimodal Distribution shows the size distribution calculated using the fitting method chosen in Data Analysis → Size Distribution. The Lognormal Distribution shows the size distribution as calculated from a Cumulant Analysis fit of C(t).