

**ALV-5000 Instrument Instructions****Dynamic Light Scattering Software:**

- Open “ALV Correlator Software v 3.0”
- Dialog box will pop-up asking about settings; click OK
- Software should say “ALV found and recognized” [\*if not, see Usage Notes, below]

**Navigating the Software Window:**Lower Status Bar:

Sample Angle Wave Index Visc Temp Diode

**Sample** opens a dialog box for solvent selection

**Angle** is a user control; default value is 90

**Index**, **Visc** are user inputs, required for accurate size measurements

-If solvent selected in **Sample**, both **Index** and **Visc** autopopulate.

-Default values are for water.

**Wave**, **Temp**, **Diode** are measured values and cannot be modified

Upper Control Bar:

File Edit Window Sample QuickSet Run Setup Fit Display Script Help

**To configure DLS measurements:**

- Setup → ALV Correlator Setup
  - Dialog box opens, with tabs:
    - Correlation: choose Single & Cross
    - Scaling: use drop-down menu to select “Off”
    - Duration & Runs: check box for “Create experimental schedule via script”
    - Select “Edit script”
      - Duration: 10, 30, or 60 seconds is generally sufficient
      - AutoScale: 0 (for “Off”)
      - PostWait: 0 (for continuous measurements)
      - Angle: 90 (usually sufficient for DLS, other angles allowed)
        - Consider using larger angle for very small particles (~150)
        - Setting Angle in script overrides Lower Status Bar value
      - Number of runs: set in line “for i = 1 to 100” (change 100 to desired quantity of runs; at least 10 for statistical purposes)
      - Choose “Compile and Run” to update script table
        - Prompt asks if you want to save the script; note that this option does not save any data, it simply saves the protocol for future reference.
      - Select Filename, including path, in “Write measured data to file...”
        - This will be a “summary file” containing data from all runs
- File → Set AutoSave
  - Check the box “Use AutoSave”
  - Use the pull-down menu to navigate to Drive E: /
  - Choose Filename; set “Auto-number start value” counter to “0000” if necessary.
  - These will be “data-run files,” with one file saved per run

**To Begin Measurement:**

- Insert sample into sample chamber and replace cover
- Check diode level in lower right hand corner of window: for strongly scattering samples, diode intensity should be kept  $< \sim 10,000$ ; for very weakly scattering samples (i.e. proteins, polymers, or cmc measurements) diode can be set as high as 400,000 or higher, but with caution.
- Open safety goggles case in front of detectors 1-7 to prevent accidental over-illumination
- Open shutter on laser line to allow light into sample chamber; it is recommended to set up experimental parameters before opening this final shutter.
- Visually inspect scattered light from sample; strongly scattering samples will appear very bright, suggesting the diode should be lowered.
- Diode control: clockwise lowers diode intensity; counterclockwise raises diode intensity
- Hit “Play” button in upper middle portion of window to begin collection
- Scattered light intensity at detector is shown in upper right hand corner: “CH0” & “CH1”
  - If lights blink RED or value is  $> 200$  kcps
    - Stop measurements, Close shutter, Lower diode, Open shutter, and resume
    - Iterate diode adjustment if necessary
    - Note that resuming measurement will overwrite “summary file” designated in the script, while the “data-run files” will continue to increment unless counter is reset

**Usage Notes:**

- If instrument is not recognized, go to “Setup  $\rightarrow$  Instrument Setup” and choose “ALV-LSE/II” is present on Port “COM1” in the upper left “ALV-LSE Support” box. Click “OK,” and “found & initialized” dialogue should appear. If not, software may require restart.
- Diode control: clockwise lowers diode intensity; counterclockwise raises diode intensity
- When adjusting diode, if intensity is too high, close final laser line shutter (immediately before the sample), adjust diode intensity to a reasonable level, then reopen shutter and continue with experiments
  - Diode should be adjusted with caution to not over-illuminate the detectors
  - Diode level is indicated in lower right hand corner of software
  - Do not allow counts (in upper right) to blink RED or exceed  $\sim 200$  kcps

**Data Handling and Sample Organization:**

- Data is saved in the following manner
  - Summary file: Filename chosen in the “Create Script” window. File contains a summary of all collection runs, with one row of data for each of the  $n$  runs, indicating: time, scattered light intensity, temperature, diode intensity (“Monitor”), and the fitting parameters generated by the cumulant analysis
  - Data-run files: Using “AutoSave” generates  $n$  different files of chosen Filename, with numeric suffixes running from 0  $\rightarrow n-1$ . Each of these files contains raw correlation data for said collection run, and the scattered light intensity vs. time over the duration of the run.

- For the purposes of subsequent data analysis, it is often convenient to create one folder per sample measured
- ***When switching from one sample to another***  
If using the same collection protocol:
  - Choose a new Filename in the “Create Script” window, otherwise previous data will be overwritten and lost
  - AutoSave option continually increments the numeric suffix counter, so previous data should not be overwritten. However you still may wish to change the AutoSave Filename, in which case you should also reset the counter to “0000.”If changing the sample collection protocol:
  - Make desired changes in the “Edit Script” dialogue
  - Remember to “Compile & Run” new protocol (and save if desired)
  - Choose a new Filename in the “Create Script” window, otherwise previous data will be overwritten and lost
  - AutoSave option continually increments the numeric suffix counter, so previous data should not be overwritten. However you may wish to change the AutoSave Filename, in which case you should also reset the counter to “0000.”
- Data can be transferred via Zip Disk (Drive F:)
- Zip Disks and a USB Zip Disk Drive are available in the ALV room; unless data is needed urgently please do not remove the USB Zip Disk Drive from the ALV room.

**In Case of Emergency, Call 911, or 2-4400 from the phone on the wall in the ALV room.**

In case of questions during measurements or instrument usage, contact Sara at 508-596-0683.