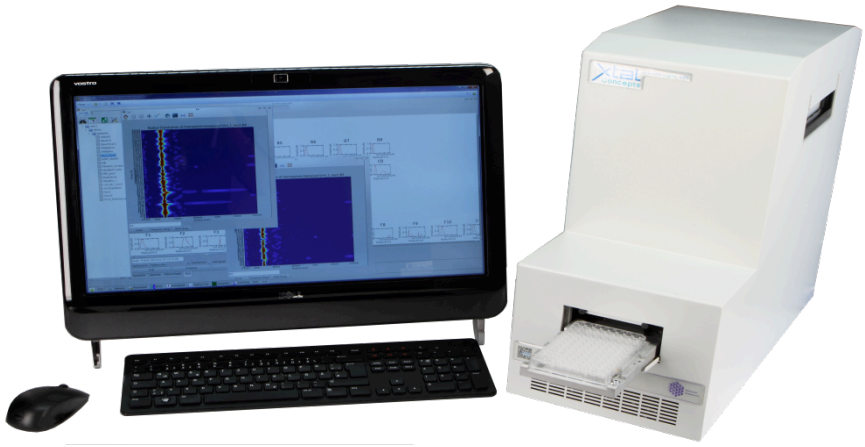
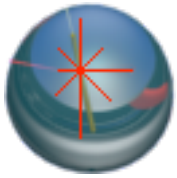
Tutorial for using the dynamic light scattering system SpectroLight 600 to analyse sample/protein solutions and crystallization droplets in multiwell plates



How to switch on the device:

- The mains switch for the Spectrolight 600 is on the back panel of the instrument. Make sure that the device is connected to the computer running the software for operation of the instrument
- Start the software with a click on the icon



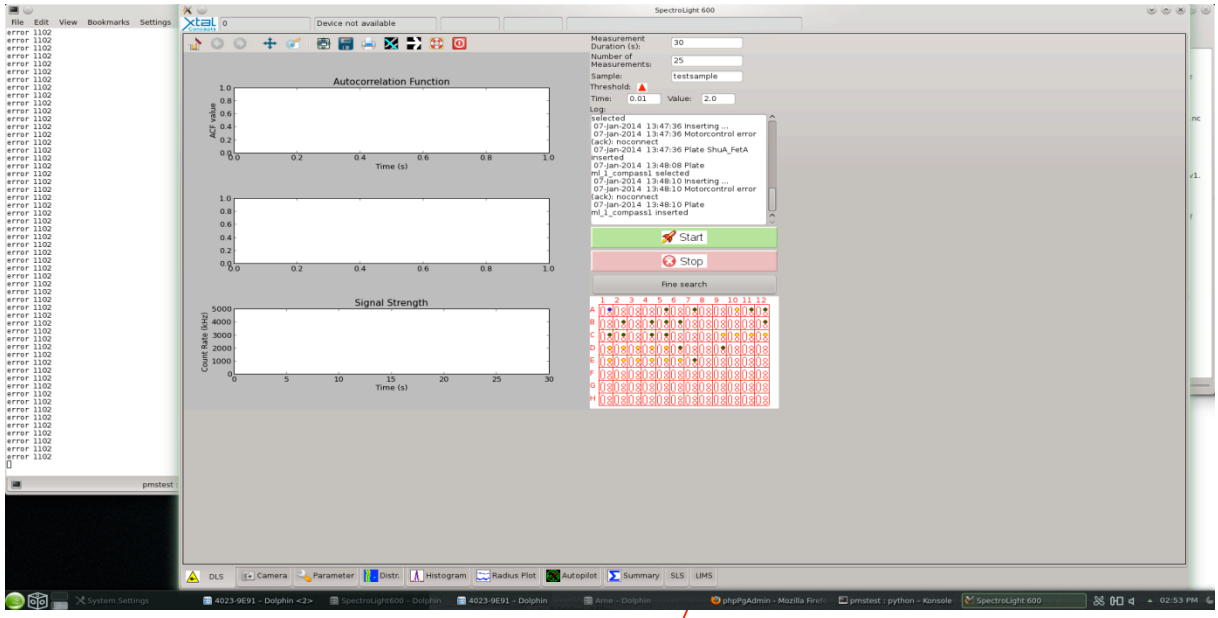
- It takes now about a minute until the system is initialized. During this time a window appears, asking for user name and password. To login as the default user enter “user1” for both. A short time later the status line on top of the screen shows “System ready”

How to prepare the samples:

- The instrument accepts multiwell plates of many different type in SBS format
- Droplet volumes of around 1 µl can be used easily. Larger volumes are also possible, droplets smaller than 500 nl may be difficult to analyse
- After preparing a multiwell plate, the plate need to be sealed very careful to avoid fingerprints etc. . Note that not all coversheets can used, some scatter too much light

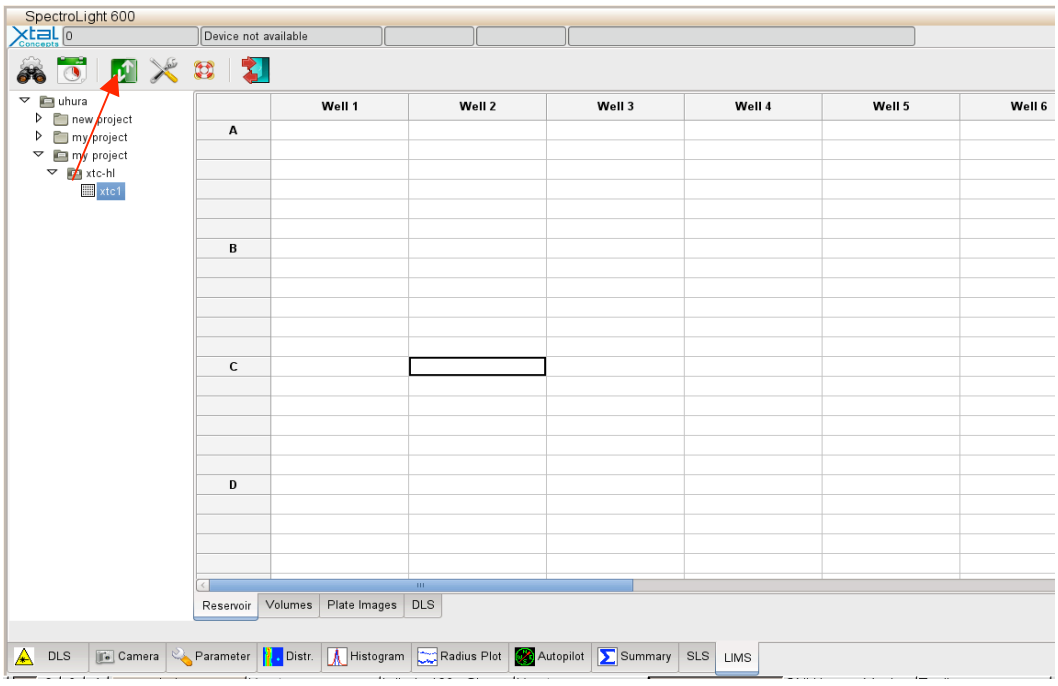
How to operate the software:

- When you are logged in, you will see the following screen, with empty DLS windows and a pictogram of the last plate in use.
- All other functions can be selected by clicking on one of the tab on bottom



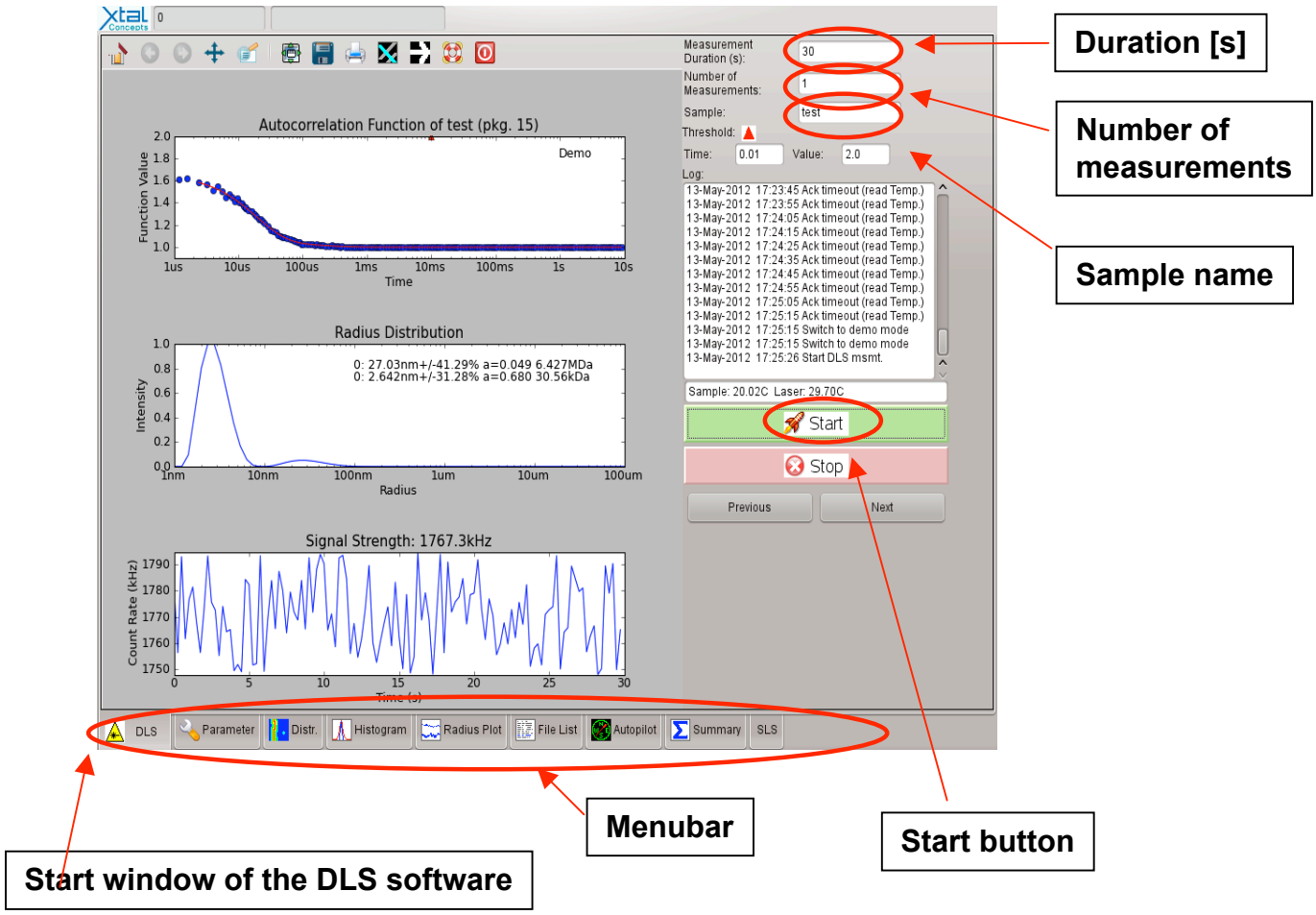
How to insert your plate:

Click on the most right tab “LIMS” and a new screen will appear. Click on the green symbol with the arrows. A dialog box opens. Click on “Eject” and insert your plate. Enter the plate name and click on “Insert”



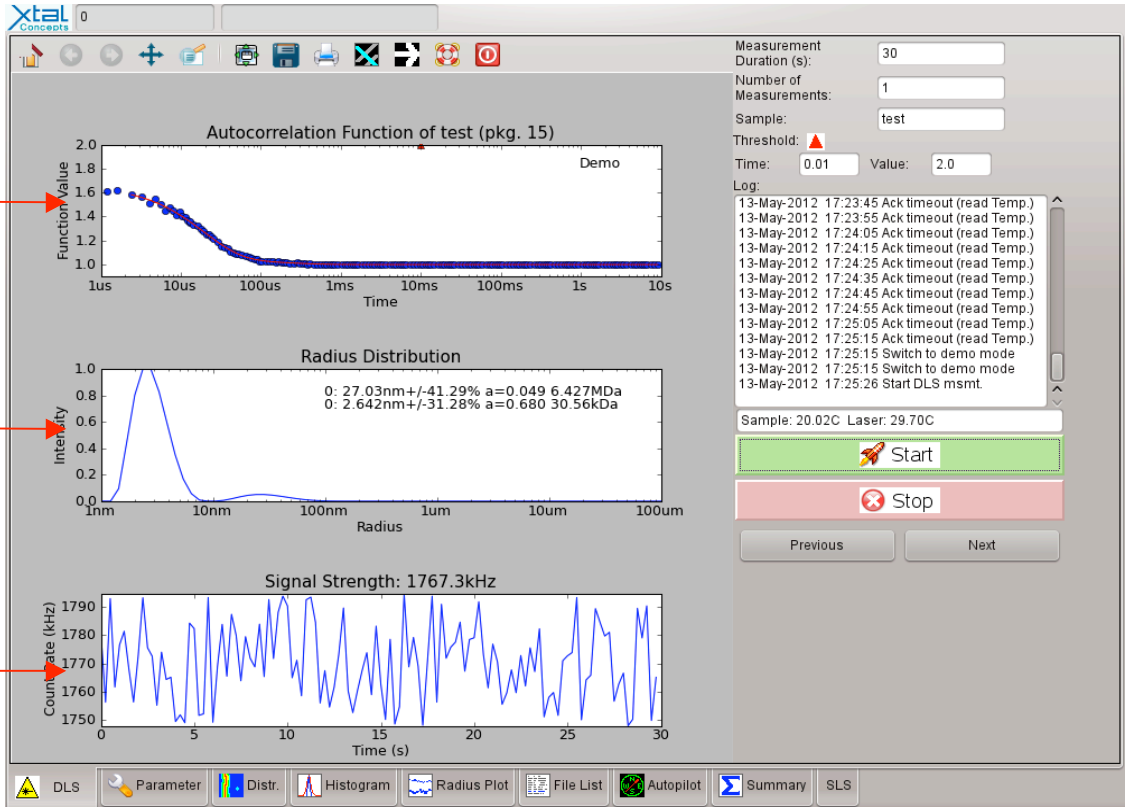
Starting a DLS measurement:

- Click on the DLS tab again. Usually the first step is a test, whether the sample solution scatters light at all or not. For the standard autosave procedure and single measurement you can just enter a name at “Sample”, “1” at “Number of measurements” and press start.. The measurement will now begin. Before, check the default input-values, described below.



- You can also measure more automatically by using the autopilot function. The first step is to prepare a working directory where the program can save the output of the DLS measurement.

Measurements



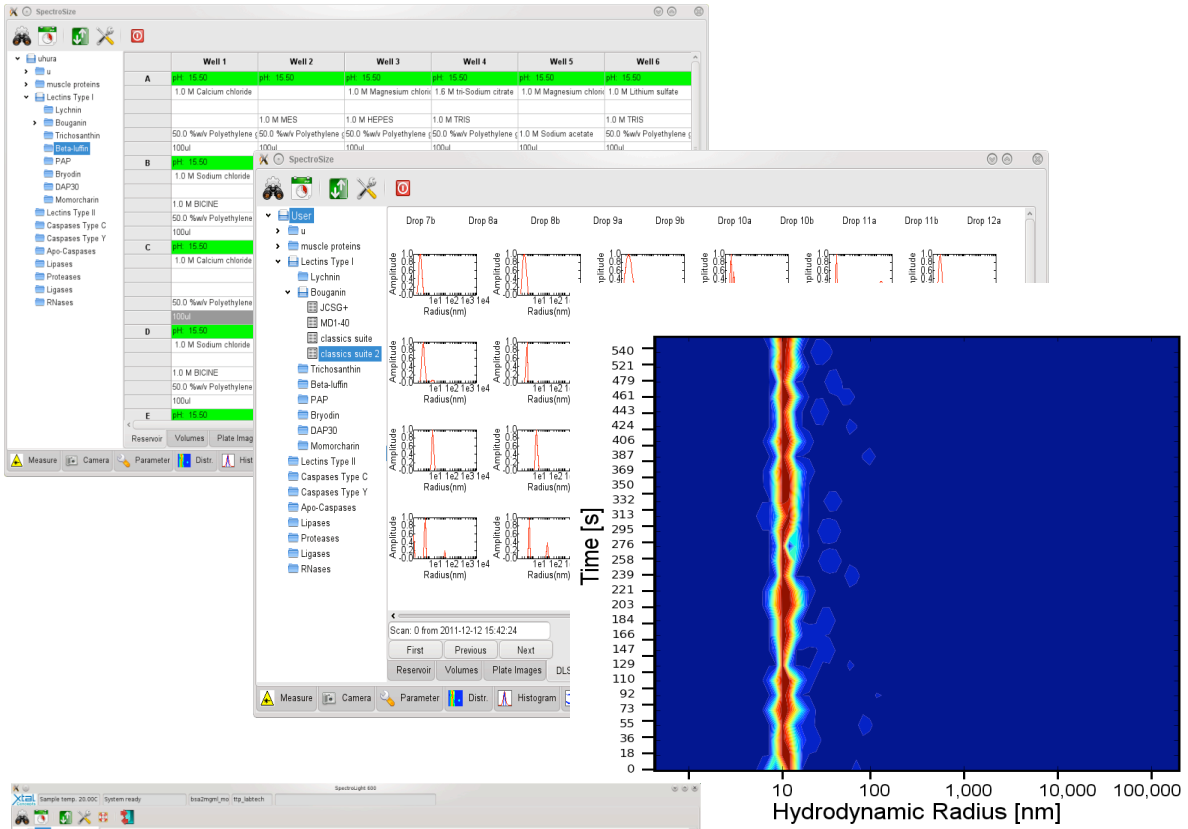
a) Autocorrelation function (ACF) shows the time dependence of the intensity fluctuations

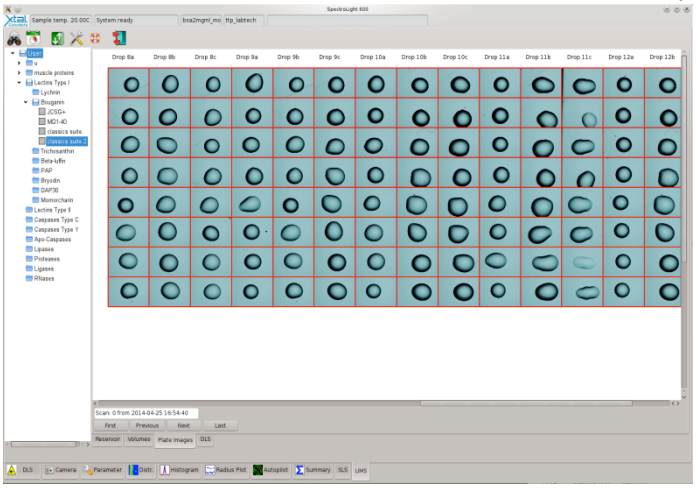
b) CONTIN analysis of the ACF provides the particle radius distribution of the sample.
Narrow peaks indicate that only one particle size is present. Broad peaks show that there is a mixture of particles of similar sizes in the sample. To appear as separate peaks, particle size must be at least a factor of about 3 apart. Also shown: Calculated values for molecular weight of the particles.

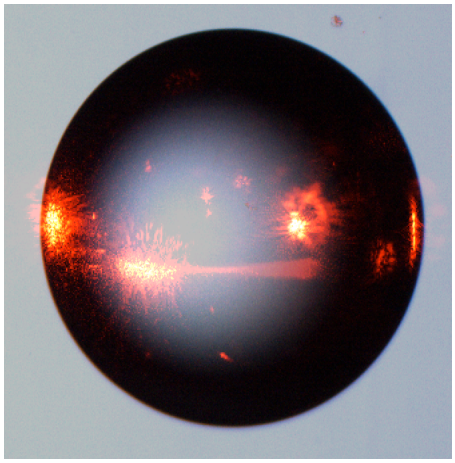
c) Shows the count rate (number of photons registered by the detector) in kHz. Usually count rates between 10 and 1000 Khz are desired.The variation of the count rate within one measurement should not be too large to obtain meaningful results.

Try the other functions of the system by clicking on the tabs:

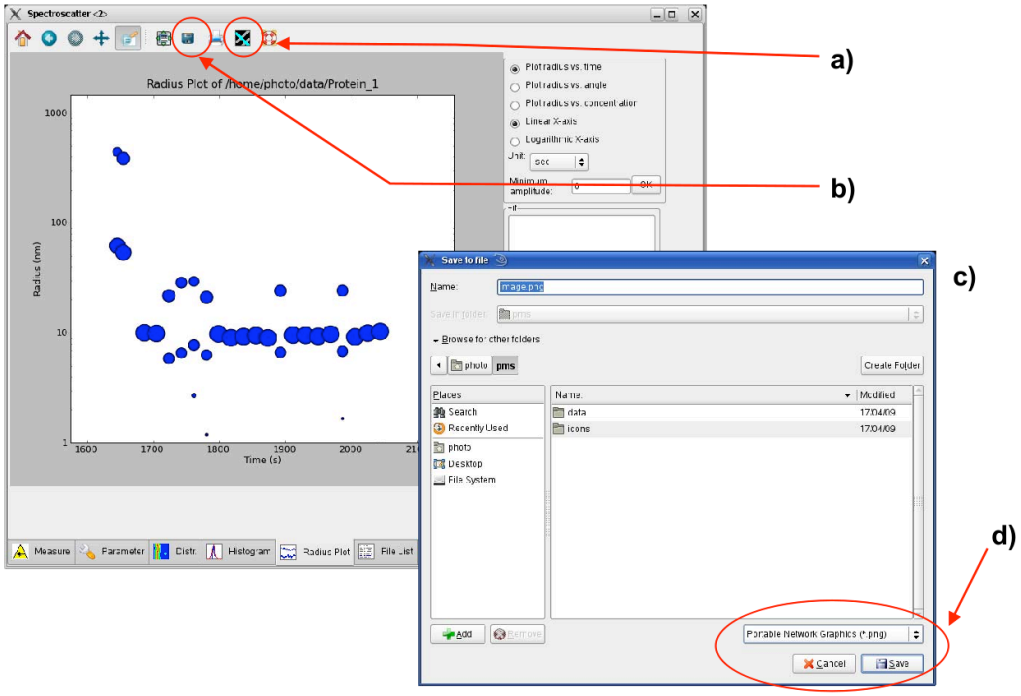
Camera:	Take a look at your droplets. Have you got crystals already?
Distribution:	Obtain a graphic representation of your DLS measurements
Histogram:	Get numerical values, statistics etc.
Radius plot:	Show a curve of yourmeasured radius values
Autopilot:	Make measurements automatically
LIMS:	A laboratory information management system is integrated to keep track of all your data







Export of evaluated data



- In each graphical evaluation tool sub-menu you can easily export your data as raw data **(a)** for further evaluation with e.g. Excel or Origin and image **(b)** by just pressing the respective button in the upper menu bar. A new window appears **(c)** in which you can select the directory where the data should be saved and insert the name of the new file.

- If you want to export as an image you can select at **(d)** the filetype. Spectro so far supports png, eps, bmp, svg and pdf-format. If high-resolution (600 dpi) is required the best option would be eps. For PowerPoint-presentations the png-format is sufficient.