Preliminary report for proposal 8-03-611 at the ILL and MX 1034 at the ESRF.

Small-angle neutron scattering was measured from nanodiscs made with either DLPC, POPC or DMPC in the phospholipid core. Two different contrast were applied: 42%D_2O and 100%D_2O. The measurements were performed at temperatures relevant to the main transition temperatures for each phospholipid and to previous SAXS measurements in nanodiscs with POPC or DLPC. After the beam time at D11 the samples were taken to ID14-3 SAXS beam line at the ESRF to measure SAXS data from the very same systems.
Thereby, we have obtained small-angle scattering data at three different contrast situations, giving the basis for detailed information on different parts of the nanodisc structure. The detailed structure analysis is in progress.

Current status:

Our analysis method has been expanded to include the data sets obtained at the three different contrasts. A simultaneous fit to the three scattering curves of a DLPC nanodisc at 20 C is shown in figure 1. The two data sets at top are SANS measurements obtained at respectively 100% D2O (top curve) and 42% D2O (middle), while the data set at bottom is the SAXS data. All data are given in absolute units (cm^{-1}).
The SAS data is fitted against two models. One model, shown in blue, assumes perfectly round nanodiscs whereas the other model (in red) allows for a degree of ellipsity. From the model fits we observe a better fit for the elliptical model (in red). Also notable is the systematic deviation of the model assuming a round shape (blue curve) these are most profound in the SAXS fit but also present in the SANS fits.
These conclusions have been accepted for publication in Journal of the American Chemical Society.

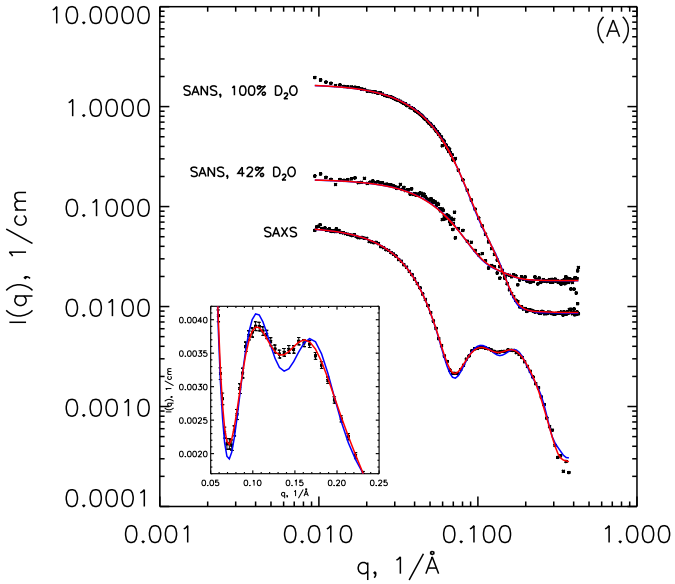

Figure 1. Top SANS in 100% D2O buffer, middle SANS in 42% D2O and bottom SAXS data from ESRF. The fits are made from all three data sets combined. Two models are fitted one assumes a round (blue) shape and one allows for an ellipsity (red). The round model has systematic deviations from the data, this is shown in the insert.