AUC	**Sedimentation equilibrium**

THE PRINCIPLE :

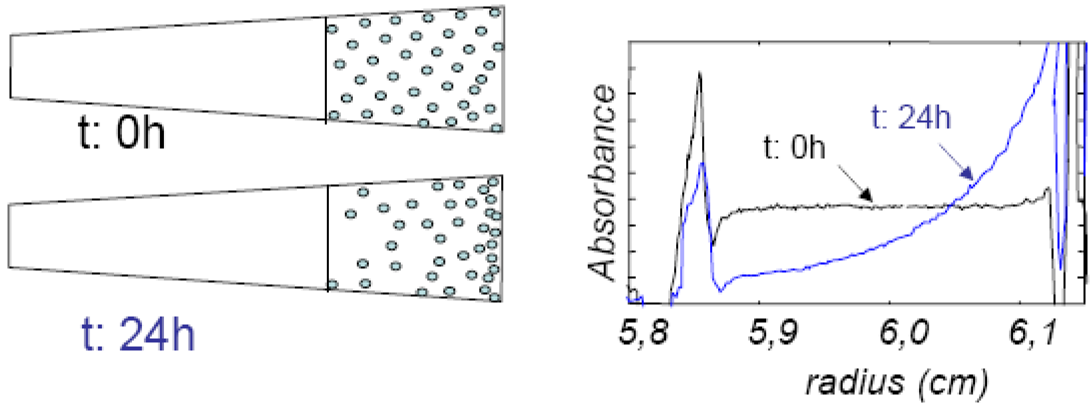
Equilibrium sedimentation (ES) allows describing the concentrations of macromolecules in solution when submitted to centrifugal force, in conditions of equilibrium, typically using absorbance optics.

ES gives information on the **molecular weight** of the macromolecules and on the **association-dissociation equilibrium constant** of the complexes.

The solutions of macromolecules are centrifuged at different angular velocities and during some days. At equilibrium -after typically 24 hours for each velocity- a smooth gradient of concentration is obtained. The experiment is performed at quite low angular velocity and with small volumes of sample (< 200 µl). For an optical path of 12 mm :

If the sample is really stable :	180µl Ech + 10µl FC43 / 200µl solvent
If the sample is stable :	110µl Ech + 10µl FC43 / 130µl solvent
If the sample perhaps not so stable :	80µl Ech + 10µl FC43 / 100µl solvent
If the sample is poorly stable :	40µl Ech + 10µl FC43 / 60µl solvent

A central piece with 2 or 6 channel is chosen depending on the volumes of the samples.



THE EXPERIMENT :

1- Determine the parameters of the sample and solvent : vbar, molecular weight, *s*, density et viscosity : SEDNTERP, S-RHouMnew.xls and/or measurement of the solvent density (density-meter DMA5000)
2- Select the angular velocities for AUC experiments: SEDFIT
3- Start the experiment : XLI
4- Analyze the data : SEDFIT, WIN MATCH and SEDPHAT

PRINCIPE DE L'ANALYSE :

In the condition of equilibrium, the Lamm equation (see the file : sedimentation velocity) is simplified:

$$c(r) = \Sigma\, c_{0i} .\ \exp\,[\omega^2 M_{bi} / 2RT].\ (r^2 - r_0^2) + \delta$$

with :

- $c(r)$ the concentration at radial distance r
- c_{0i} the concentration of the species i at radial distance r_0 (usually the first point for the fit)
- ω the angular velocity (s^{-1}) - M_{bi} the buoyant molar mass of the species i : $M_{bi} = M_i.(1 - \bar{v}_i \rho°)$
- R: gaz constant - T: température (°K) - δ: noise (solvent signal considered as constant)

For an equilibrium of association, the concentrations c_{0i} of the species are linked by the association constant, and the molecular masses by the stœchiometries.

Typically, different profiles of sedimentation equilibrium obtained at different concentrations and different velocities are globally fitted.