

CHALLENGES IN MOLECULAR AND SOFT MATTER

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Molecular and soft matter has enjoyed a substantial increase of interest over the last years, and there is significant cross-fertilisation with biology. We will discuss some exciting issues and challenges in this area, and how they can be addressed by scattering techniques, using, inter alia, some of our own projects related to protein biophysics as examples.

Keywords are

- controlled protein aggregation
- reentrant phase transition
- liquid-liquid phase separation
- protein crystallisation
- protein folding
- unspecific interactions of proteins with other proteins
- unspecific interactions of proteins with interfaces

with particular emphasis on how these can be controlled by manipulating the charge using specific salt ions of different valencies.

Since for these complex systems frequently the use of one single technique is insufficient to fully understand the underlying mechanisms, we will also discuss the important point of the complementarity of different experimental techniques as well as theory and simulations.

In this context, we will discuss the partnership for soft condensed matter (PSCM) involving the ESRF and the ILL and outside partners, and the use of complementary techniques, such as

- SLS / SAXS / SANS
- DLS / PCS / QENS

and also

- protein crystallography / SAXS / ASAXS
- zeta potential / IR / UV-vis / CD

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