



Light-Tunable Structures by Self-Assembly: In-Situ SANS under Irradiation



A joint PhD position between the Institut Laue – Langevin (ILL), Grenoble, France and the Friedrich-Alexander University Erlangen-Nürnberg (FAU), Erlangen, Germany

The creation of responsive nanostructures is of great interest, for example to build smart carrier systems, sensors or molecular motors. Due to the large potential lying in the conversion of sun light into mechanical energy, light is an especially desirable trigger. Supramolecular nanoparticles have a large advantage offering the possibility of making use of a facile and versatile toolbox principle. A few years ago, we introduced electrostatic self-assembly as new concept for the formation of supramolecular nano-objects with a variety of shapes through the association of macroions and oppositely charged multivalent molecular ions in solution. The combination of electrostatics and secondary forces such as mutual $\pi - \pi$ interaction of ionic dye molecules is used to direct the structure formation. A large set of techniques will be used for the characterization of the nanostructures, such as small-angle neutron scattering (SANS), static and dynamic light scattering (SLS & DLS, AFM, UV-Vis spectroscopy, Isothermal Titration Calorimetry (ITC) and ζ -potential measurements. Central will also be the development of a photo-stirring sample cell for time-resolved SANS experiments to fundamentally elucidate structural effects that occur upon irradiation. Tying together scattering and thermodynamic information, general understanding of the self-assembly under irradiation will be developed so that this project sets the key for a targeted structure triggering with potential in solar energy conversion, and drug delivery.

We are seeking a highly-motivated candidate with a background in soft condensed matter, nanoscience and/or scattering and a Master's degree in physics, chemistry or similar. Knowledge of at least some of the above-mentioned techniques is required. To analyse SANS data some basic programming skills (e.g. Python, Matlab) would be helpful.

The Friedrich-Alexander university Erlangen-Nürnberg and the Institut Laue – Langevin jointly advertise a 3-year PhD position, of which the first 6 months will be spent at the FAU university in Germany and the subsequent 30 months at the ILL in France, both with visits to the complementary place. The PhD degree will be awarded by FAU. This PhD project will build on many years of collaboration of the two supervisors who have recently supervised a successful PhD student, as evident from a series of publications in highly ranked journals.

For more information please contact Prof. Dr. F. Gröhn (franziska.groehn@fau.de) or Dr. R. Schweins (schweins@ill.eu). If you would like to apply for this position please send your documents to both supervisors.

The position will remain open until filled, but at least until 1-July-2018.