

Small and Wide Angle Scattering to Characterize Nanotechnology for Biological and Biomedical Applications

Heinz Amenitsch

Institute of Biophysics and Nanosystems Research, Austrian Academy of Sciences,
Schmiedlstr. 6, A-8043 Graz, Austria, e-mail: amenitsch@elettra.trieste.it

Simultaneous Small and Wide Angle X-ray Scattering (SWAXS) is considered in the meanwhile as standard tool for the structural characterization of nano-objects in all states of matter: solution, solid, surfaces and gas phase. The key factor of success is, on one hand, its versatile applicability and, on the other hand, its high precision in structure analysis for tackling specific questions in biological research. By combining it with results from other complementary methods like Bioinformatics, NMR or Crystallography detailed structural information (from atomic lattice to supramolecular envelope) can be obtained by performing simple and fast experiments under *in situ* conditions. Depending on the required data quality, space and time-resolution the experiments can be performed either at home on laboratory instruments (typically 100 μm spots and minute resolutions) or at large scale infrastructures providing scattering instruments with down to sub-microns beams or sub-millisecond time-resolution.

This presentation should give an overview of the technique itself as well as the latest developments in the field. Both aspects of the presentation are highlighted by examples of various nanosystems relevant for biological and biomedical applications such as nanoparticle synthesis, formation of nanostructured surfaces, interaction of proteins as well as biomembranes with drugs, insights into DNA/drug delivery systems.