Small Angle X-ray Scattering from Macromolecular Solutions and Nanoparticles

Dmitri I. Svergun, European Molecular Biology Laboratory, Hamburg Outstation c/o DESY, Notkestr. 85, D22603 Hamburg, Germany

Small-angle X-ray scattering (SAXS) experiences a renaissance in the studies of macromolecular solutions allowing one to study the structure of native particles and to rapidly analyze structural changes in response to variations in external conditions [1]. Novel data analysis methods significantly enhanced resolution and reliability of structural models provided by the technique. Emerging automation of the experiment, data processing and interpretation make solution SAXS a streamline tool for large scale structural studies in molecular biology. The method provides low resolution macromolecular shapes ab initio and is readily combined with other structural and biochemical techniques in multidisciplinary studies to build rigid body models of complexes and to characterize oligomeric mixtures and flexible systems. The novel approaches have also become useful for non-biological systems and processes, e.g. formation of nanoparticles. The new developments in SAXS will be illustrated by examples of practical applications to different objects.