

X-Ray studies of biological matter – from micro-SAXS to nano-imaging

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Biological matter – ranging from whole cells down to cellular components such as proteins – are governed by nanometer length scales. X-ray scattering and diffraction techniques are extremely well suited to study such systems as the spatial resolution extends well into the relevant length scales. At the same time, the investigation of biological systems requires well-defined and controllable sample environments. One way to establish such environments is by employing microfluidic devices tailored for the particular experiment. The combination of both microfluidics and X-ray micro-/nano-diffraction provides an innovative tool for biomatter research. Two particular examples will be shown. (i) The biomolecular assembly of proteins is studied in vitro by diffusively mixing in assembly buffer and following the subsequent assembly steps downstream in the flow channel. (ii) Cells are imaged on the nanometer scale by scanning x-ray diffraction using a nanometer-focused beam.