

Enhanced Sample Environments for Biological SAXS at SSRL BL4-2

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Synchrotron based small angle X-ray scattering is an extremely versatile tool for structural investigation of matter at the nanoscale and can be applied in a variety of different ways. In structural biology and biophysics applications the experiments range from static and time resolved solution scattering, to low angle lipid and fiber diffraction. To efficiently handle these diverse experiments, expand their parameter space and obtain high quality data from the measurements, highly optimized sample environments are typically available at the beamlines. In addition to measure the scattering signal, complementary techniques are increasingly integrated into these sample environments to maximize the information gathered from the sample during the experiment. At the BioSAXS beamline BL4-2 at SSRL significant progress has been made over the last several years in developing new and refining the existing sample handling methods to augment control over environmental parameters, include or improve complementary sample characterization methods or add handles for remote and automated operation. These efforts include for example increasing the accessible temperature range of flow cells for measurements under supercooled conditions, adding automated spectroscopic measurements to the Autosampler for measuring protein concentration prior to the SAXS measurements as well as adding light scattering and refractive index detectors to our SEC-SAXS system. These and other recent developments and the experiments they enable will be discussed.