

Small Angle X-ray Scattering Workshop and Application in Biomolecular Studies

Open Remarks by Dr. Ad Bax Introduction (Dr. Yun-Xing Wang)

Part One: Solution Small Angle X-ray Scattering : Basic Principles and Experimental Aspects

1. General Aspects (Dr. Xiaobing Zuo)
 - a. History of solution x-ray scattering: X-ray source, methodology
 - b. Scales of various methods
 - c. X-ray scattering vs neutron scattering and light scattering
2. Physics of x-ray scattering (Dr. Xiaobing Zuo)
 - a. Scattering phenomenon and interference
 - b. From crystal and fiber diffraction to solution scattering
 - c. X-ray contrast
 - d. Form factor and object shapes
 - e. Theory on solution scattering calculations
3. Experimental Aspects of Scattering (Dr. Alex Grishaev)
 - a. Instruments
 - X-ray generator (bench-top, synchrotron)
 - Detector
 - Synchrotron-based setups
 - b. Data acquisition
 - Synchrotron based SAXS experiments
 - Bench-top x-ray source based SAXS experiments
 - Neutron scattering
 - c. Scattering sample preparations
4. Data Processing (Dr. Xiaobing Zuo)
 - a. 2D-> 1D data conversion
 - b. Background subtraction
 - c. Data quality evaluation

Part Two: Data Interpretation and Application in Structural Biology

1. X-ray scattering profile and embedded information (Dr. Xiaobing Zuo)
 - a. d-spacing / resolution
 - b. Hierarchical structural information
 - c. SAXS vs WAXS
 - d. Guinier plot
 - e. Radius of gyration
 - f. Molecular weight
 - g. Porod's law

- h. Porod invariant
- i. Pair distance distribution function
- 2. Molecular envelope and shape (**Dr. Alex Grishaev**)
 - a. Low-resolution model/shape reconstruction
 - b. Molecular conformation
 - c. Contrasting (SAXS and SANS)
- 3. SAXS in Combined Use for Higher Resolution Structure
 - a. Joint refinement with NMR data (**Dr. Alex Grishaev**)
 - b. Using SAXS to determine global structures of complexes: GASR (**Dr. Jinbu Wang**)