

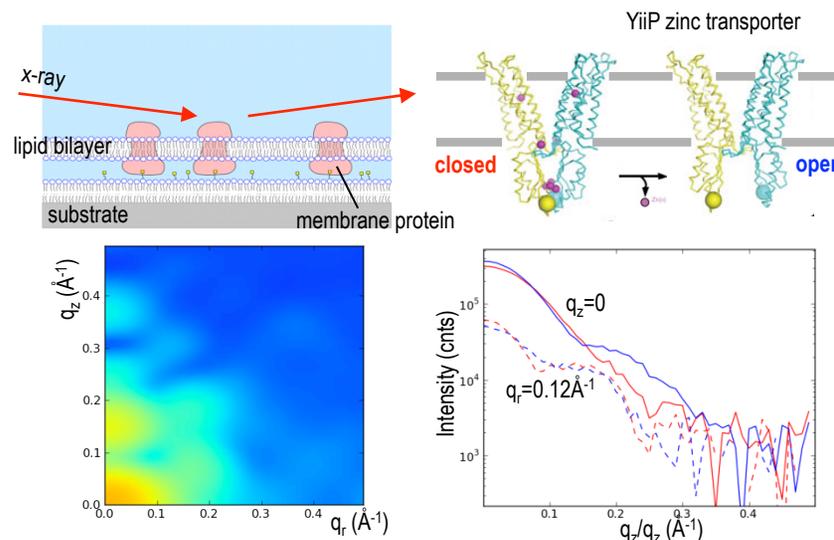
High Brilliance X-ray Scattering for Life Sciences (LiX)

LiX at NSLS-II

- Time-resolved x-ray scattering measurements of proteins and DNA/RNA in solution using flow cells on time scales down to $10\mu\text{s}$
- Grazing incident scattering from 2D solutions of membrane proteins embedded in near-native membranes
- $1\mu\text{m}$ beam scanning probe imaging and tomography of biological tissues

Examples of Science Areas & Impact

- **PROTEIN DYNAMICS:** Help understand the dynamic processes of protein conformation change (e.g. folding) and enzymatic reaction
- **MEMBRANE PROTEINS:** Resolve the structure of membrane proteins at low resolution; Reveal how the structures of these proteins change in response to external stimuli
- **TISSUE ENGINEERING:** Help elucidate the relationship between the hierarchical structure in natural and engineered tissues and their functional properties.



A unique capability of the LiX beamline is to collect scattering data from membrane proteins embedded in near native membranes. This is the two-dimensional analogue of the solution scattering technique that has been very successful for soluble proteins in recent years. This figure shows simulated data from YiiP in DOPC bilayer in open and closed states. Simulated noise, based on estimated scattering cross-section, has been added in the line cuts (lower right).

Beamline Capabilities

TECHNIQUES: micro-beam, simultaneous small and wide angle x-ray, transmission and grazing incidence

SOURCE: undulator (U23)

ENERGY RANGE / RESOLUTION: 2-20keV @ 0.01%

Q RANGE: $0.002-3.0\text{\AA}^{-1}$ @ 12keV