Real-Time Data Analysis and Experimental Adjustments with Interceptor at SSRL

Dr. Artem Y Lyubimov[1]

[1]SSRL, Menlo Park

lyubimov@stanford.edu

Implementation of multi-crystal and serial crystallography methods at SSRL allows users to carry out increasingly sophisticated time-resolved and multi-method studies of key biomolecular systems. Increased experimental complexity, however, requires researchers to extensively monitor the experiment in real time. To that end, the Structural and Molecular Biology group at SSRL (SSRL-SMB) developed the program Interceptor, which carries out highly-automated on-the-fly analysis of collected diffraction data. Designed to run continuously in the background and requiring no user input, the Interceptor is able to keep pace with data collection at rates of up to 166 Hz. By displaying information in an easy-to-read format via the beamline control program BluIce, the Interceptor enables users to digest critical information and make quick decisions without learning any new controls.

Implemented at all crystallography beamlines at SSRL, the Interceptor has already proven valuable to users who need to monitor the accumulation of radiation damage, refine their multi-crystal approach, or determine when a serial experiment needs adjustment. Real-time feedback has markedly improved beamtime use efficiency while also allowing researchers increased control over their experiments.