

Small-Cell Serial Femtosecond Crystallography as a Method for High-Throughput Materials Discovery

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Our collaboration recently demonstrated proof-of-principle success for small unit cell serial femtosecond X-ray crystallography (SC-SFX) using an X-ray free electron laser (XFEL) as a strategy for producing datasets that can be used for *de novo* structure solutions. This achievement marks a significant advancement beyond the conventional SFX capabilities used for protein structure determination. We were able to solve a partial structure for the metal organic coordination polymer, silver benzeneselenolate ($6 \times 7 \times 29 \text{ \AA}$ unit cell dimensions) by direct methods at a resolution of 1.5 \AA from datasets collected at LCLS and 1.2 \AA from datasets collected at SACLA (Schriber, et al. *in preparation*, 2019). SC-SFX in combination with the femtosecond time resolution of the XFEL will allow us to study structural dynamics in materials through pump-probe experiments. We present our initial results using SC-SFX and future goals towards high-throughput structure solutions and structural dynamics investigations of novel materials.