

WaveGate X-Ray Chopper for Synchrotron-Based Time-Resolved Serial Crystallography using the Hadamard Transform

We present a new method for tailoring the time-structure of hard X-ray synchrotron beams for time-resolved serial crystallography. The central element of this method is a variable solid-state X-ray chopper called the WaveGate. It can span arbitrary temporal gates with durations of 100 ns to milliseconds and longer. In this project we employ the WaveGate to generate complex sequences of x-ray probe pulses based on the Hadamard transform, which allow a faster time-resolution than would be expected with fast pump-probe experiments for flux limited sources.

We will present a full characterization of the WaveGate chopper and demonstrate the feasibility of synchrotron-based time-resolved measurements using the Hadamard transform.

Primary authors: Mr SCHMIDT, Daniel (TXproducts UG); Dr VON STETTEN, David (EMBL Hamburg); Dr AGTHE, Michael (EMBL Hamburg); Dr YORKE, Briony A (The University of Leeds); Dr BEDDARD, Godfrey S. (University of Edinburgh); Prof. PEARSON, Arwen R. (6) Hamburg Centre for Ultrafast Imaging & Institut for Nanostructure and Solid State Physics); GAAL, Peter (TXproducts UG)

Presenter: GAAL, Peter (TXproducts UG)