

## Sub-100 Microsecond Time Resolved SAXS at BioCAT

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Time resolved SAXS (TR-SAXS) allows the measurement of kinetic intermediates after an initiating event. The BioCAT beamline (Sector 18) at the Advanced Photon Source uses chaotic and laminar flow microfluidic mixers to measure time ranges from ~80  $\mu$ s to 1.5 s. Recent advances include: new mixer designs to optimize accessible time ranges and sample consumption; improved microbeam focusing and mixer fabrication techniques to reduce parasitic scattering; improved positioning and exposure triggering for optimal reliability; and a new, easy to use GUI for controlling all aspects of the experiments. These advances have significantly improved data quality and ease of use. Time resolved experiments can now be done with as little as ~200  $\mu$ L of sample at modest concentrations for slow (>1 ms) reactions, whereas ultra-fast time resolved measurements can be done with as little as ~1 mL of sample. The TR-SAXS program at BioCAT is open to general users.