## Time-resolved and Charge-density Studies at ChemMatCARS

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ChemMatCARS, a synchrotron-based national facility for Chemistry and Materials Science located at the Advanced Photon Source, is developing strong programs in time-resolved, charge-density, and micro (~10  $\mu$ m) crystallography. This presentation will focus on the time-resolved and charge-density capabilities at the sector.

In small-molecule time-resolved studies, monochromatic x-rays are used to probe optically pumped molecular excited states. Experiments are performed using a rotating chopper wheel to gate the x-ray source and trigger the laser. Results show significant changes in molecular structure after laser excitation[1].

Recently, several experimental runs were devoted to assessing whether or not the beamline/instrument quality was sufficient for precision charge-density measurements[2]. For these high-resolution studies, a relatively short wavelength is used ( $\lambda$ =0.42 Å) typically yielding an instrument resolution of 1.34 Å<sup>-1</sup>. These experiments produced R internal values as low as R<sub>int</sub>~0.02.

[1] Coppens P., Gerlits O., Vorontsov I.I., Kovalevsky A.Yu., Chen Y.-S., Graber T., Novozhilova I.V., *Chem. Commun.*, 2004, 2144-2145. [2] Poulsen R., Bentien A., Graber T., Iverson B., *Acta Cryst.*, 2004, A60, 382-389. Keywords: time-resolved, charge-density, synchrotron