

The Role of the NSF's ChemMatCARS Advanced Crystallography Program in the Economic Crystallography

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NSF's ChemMatCARS is a national user facility located in Chicago, IL, USA, specializing in frontier research in chemistry and materials science using synchrotron X-rays at the Advanced Photon Source (APS) at Argonne National Laboratory (ANL). The University of Chicago operates NSF's ChemMatCARS, which provides unique high-brilliance X-ray resources that enable advanced small-molecule crystallography research. This facility offers research tools for single crystal diffraction studies of small molecules, facilitating investigations into a wide range of scientific phenomena. These phenomena include studies of charge density distributions (quantum crystallography), the disorder in thermoelectric materials, photo-responsive materials for energy production and storage, capturing reactive intermediates in photosynthesis models and catalysts, studying phase transition under extreme conditions (extra low temperature and high pressure using Diamond Anvil Cell).

Starting from May 2024, after the APS-U upgrade, NSF's ChemMatCARS advanced crystallography program will offer mail-in crystallography services, including the use of a sample auto-exchanger (robot) funded by a supplemental grant awarded by the NSF Division of Chemistry. Additionally, the program is developing a sample submission website and remote data collection software. To learn more about the current capabilities of Advanced Crystallography at NSF's ChemMatCARS, please visit their website at <https://chemmatcars.uchicago.edu/scientific-program/advanced-crystallography/>. The facility welcomes all feedback to improve its services continuously.