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Comparison of Synchrotron and Lab-based Chemical Crystallography: Operation of ALS BL 11.3 and Prospects for Future Developments. Howard A. Padmore¹, Nobumichi Tamura¹, Sirine Fakra¹, Frederick J. Hollander², Allen G. Oliver², ¹Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, ²College of Chemistry, Univ. of California, Berkeley, Berkeley, CA 94720.

Beamline 11.3 at the ALS was designed for small molecule chemical crystallography and has been in routine use for around 1 year. UCB Chemistry department is a partner in developing this synchrotron-based system, and in addition runs a lab-based system on campus. The intent of this paper is to give examples of problems that can uniquely be addressed using synchrotrons such as solution for very small crystals. We will also highlight the potential difficulties of using synchrotrons such as irregular access to equipment that might change between users with slightly different experimental needs. Finally we will discuss the limitations of our current system and opportunities to improve its, including the benefits of moving to an ALS superconducting bend magnet, use of wider bandpass optics, and use of very rapid readout x-ray detectors based on CCD column parallel geometry. The latter should offer 16 bit dynamic range with frame to frame times of 5 msec.