

CCD Detectors

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Area detectors and synchrotron x-ray sources have each made revolutionary impacts on protein crystallography. Marriage of these two technologies has given birth to CCD-based area detectors. Because CCD detectors are electronically readable, they are fast: an important parameter on synchrotron beamlines. CCD detectors can and have been designed that are extremely linear with x-ray flux, efficient, and with wide dynamic range. Mosaic arrays of smaller modules permit large-format CCD detectors to be fabricated. Argonne's Structural Biology Center has designed, prototyped, built, and tested such mosaic array CCD detectors, which are integral parts of the two beamlines on Sector 19 of the Advanced Photon Source. Although only recently put into commissioning, the undulator beamline at Sector 19 has already successfully solved a new crystal structure, and the CCD detector has proven to be highly effective as one component of an integrated system of compatible x-ray optics, computer system, software, electronics, and detector. This type of CCD detector is now commercially available from several companies and will likely soon be distributed at many synchrotron beamlines.