

## Support Structure for Pixel Array Detectors

It appears that many APS sectors are contemplating acquisition of one or more Pixel Array Detectors as part of their 5-year Enhancement plan. During the March '08 TWG seven 5-year enhancement plans from various groups within the APS were aired. Almost every group proposed purchase of some form of Pilatus PAD, ranging from single modules up to the 60 module 6M. Currently, the Pilatus is the only commercially available PAD detector, although Area Detector Systems will field test a multi-module prototype PAD some time in 2008. Similarly, many if not most of the APS crystallography beamlines are likely to be upgraded with fast, large PAD detectors in the next 10 years. The high speed, dynamic range and size of PAD detectors make them the likely long-term replacement technology for CCD x-ray imaging detectors, currently in use on APS crystallography beamlines.

Given the intrinsically high module multiplicity and complexity of PAD detectors one must be concerned with the practicality and cost of supporting a number of PAD detectors for routine data collection at APS beamlines. The purchase price of the 6M Pilatus is at present of order 1.5 million US dollars. Currently, only the Swiss Light Source has an operating 6M detector, presumably due to the high acquisition cost and difficulty in maintaining the 6M (the Pilatus is a long-term development effort of the SLS detector group, recently spun-off as a commercial concern). Given the technical and operational superiority of PAD detectors over currently-available CCD detectors many APS beamlines would be driven towards a purchase large-scale Pilatus PADs given the resources to acquire them. However, uncertainties in the reliability, and down times due to repair and calibration may serve as strong deterrents to adoption of PAD technology.

The APS biology beamline representatives have met to discuss these matters and have come to a consensus with regard to proposing a 5-year enhancement plan concerning PAD detector acquisition at biology crystallography beam lines. The APS biology beamline representatives currently plan to obtain funding for PAD detector acquisitions through channels outside of APS's 5-year plan. APS biology beamlines will likely apply to the NIH for funding via the NCCR P-41 or Shared Instrumentation mechanisms, or through private funding agencies. However, we propose that the APS define and fund a support group, within the APS to support PAD operations on all APS beamlines. We feel that this group should be factory trained and equipped with appropriate diagnostic and calibration tools to maintain (and repair) PAD detectors, on site, to avoid lengthy and costly down times associated with returning PAD detectors to Pilatus for in-factory maintenance. The APS could also consider acquisition of a standby-store of PAD modules to enable rapid repair of faulty PAD detectors from all APS sectors. Biology beamlines would likely contribute to the cost of equipping and maintaining a standby-module store.