

## **APS Upgrade Plans**

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The Advanced Photon Source will be upgraded in about 3 years from now. The project involves replacing the existing electron storage ring at the APS with a new array of magnets, a multibend achromat lattice. This design will reduce electron beam emittance by a factor of 70 from its present value which, together with a doubling of stored beam current and the introduction of high performance insertion devices (some superconducting), will make the resulting X-ray beams two to three orders of magnitude brighter.

The brightness and energy of X-ray beams are critical properties for research. Higher brightness, accompanied by higher coherence, means more X-rays can be focused onto a smaller, laser-like spot, allowing researchers to gather more data in greater detail in less time. Higher energies allow X-rays to penetrate deeper inside materials to reveal crucial information about a material's structure and function. The combination of high brightness and high energy allows the observation and imaging — in real time — of fast and ultrafast technologically important processes.

A vital component of the APS-U are the Feature Beamlines, a set of new and upgraded beamlines designed to allow researchers to fully exploit the extremely bright X-ray beams from the APS-U storage ring. In addition to the Feature beamlines, beamline enhancements as planned for the Structural Science group at the APS will be offer new opportunities.

The reconstruction and recommissioning of the storage ring will require a dark period of about one year for the experimental stations.