Picosecond X-ray Pulse Generation at the Advanced Photon Source

DENNIS MILLS, Argonne National Laboratory — Synchrotron radiation from storage ring-based facilities typically has a pulse length of many tens to many hundreds of picoseconds. In an effort to improve the temporal resolution of the study of dynamic and transient properties, the APS has been exploring the possibilities of producing short (a few picosecond) pulses though transverse deflection of the particle beam via radio frequency cavities installed in straight sections of the storage ring. These cavities produce a longitudinally coordinated vertical momentum to particle bunch that, when passed through an insertion device, then emits radiation with similar properties. Slits can then be used to time slice the beam or crystal optics can be employed to temporally compress the chirped radiation beam. Several approached for the implementation of this capability at the APS will be discussed along with the expected performance.

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