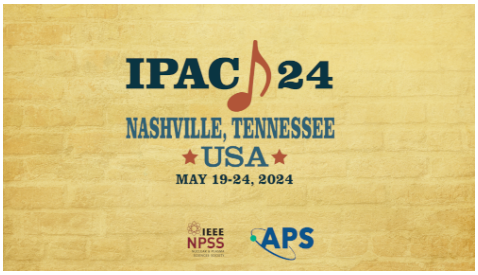

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New insertion device control system for the APS upgrade

Tuesday, 21 May 2024 16:00 (2 hours)

New Hybrid Permanent Magnet Undulators (HPMUs) have been designed and manufactured using servo motors for precise and reliable gap motion control for the Advanced Photon Source Upgrade (APS-U) project. Meanwhile, existing HPMUs equipped with legacy stepper motors are systematically replaced with servo motors. In parallel with mechanical modifications of the undulators, a comprehensive upgrade has been implemented for the control of the devices. This upgrade includes integration of standardized industrial components for replacement of motor controllers and motor drives using the Kollmorgen Programmable Controller Multi-axis Master (PCMM) controllers and the AKD2G series servo drives. Soft Input Output Controllers (IOCs) are developed and deployed to replace the legacy VME-based IOCs for both single-period undulators and Revolver undulators. In this paper, we will present the architecture of the new insertion device control system, including control mechanisms, interlock protocols, and tools for diagnostics and troubleshooting.

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