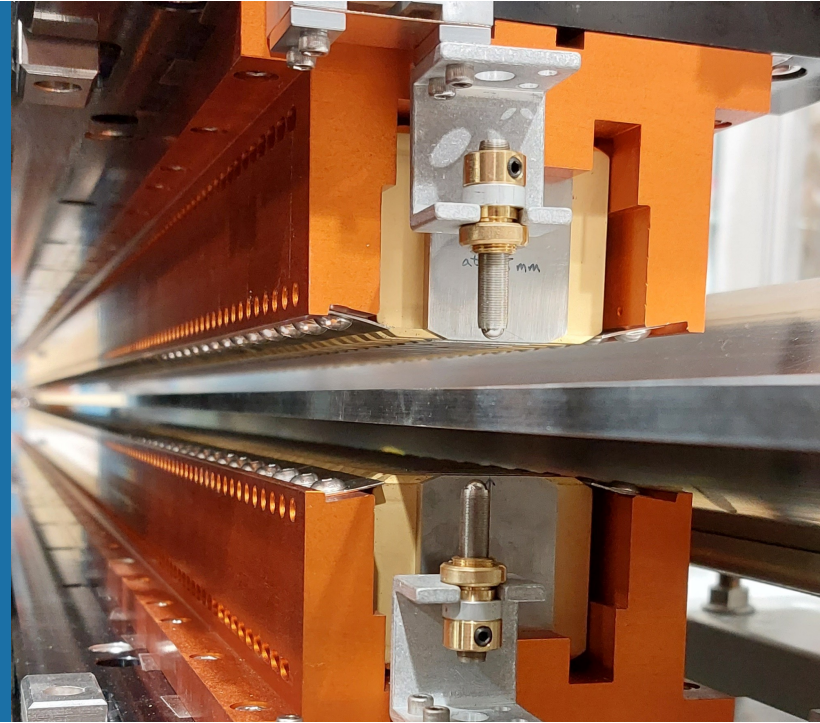


Shutdown Success Story

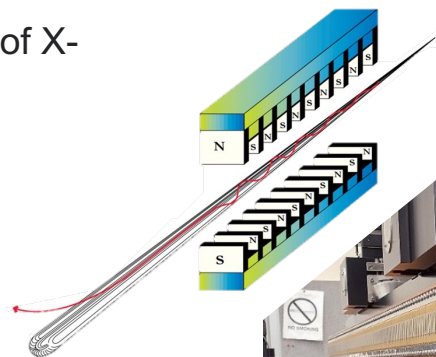
Hybrid Planar Magnet Undulator (HPMU)
Insertion Devices for APS-U

Aric Donnelly
Insertion Devices Technical Lead
APS Upgrade Project



HPMU INSERTION DEVICES FOR APS-U

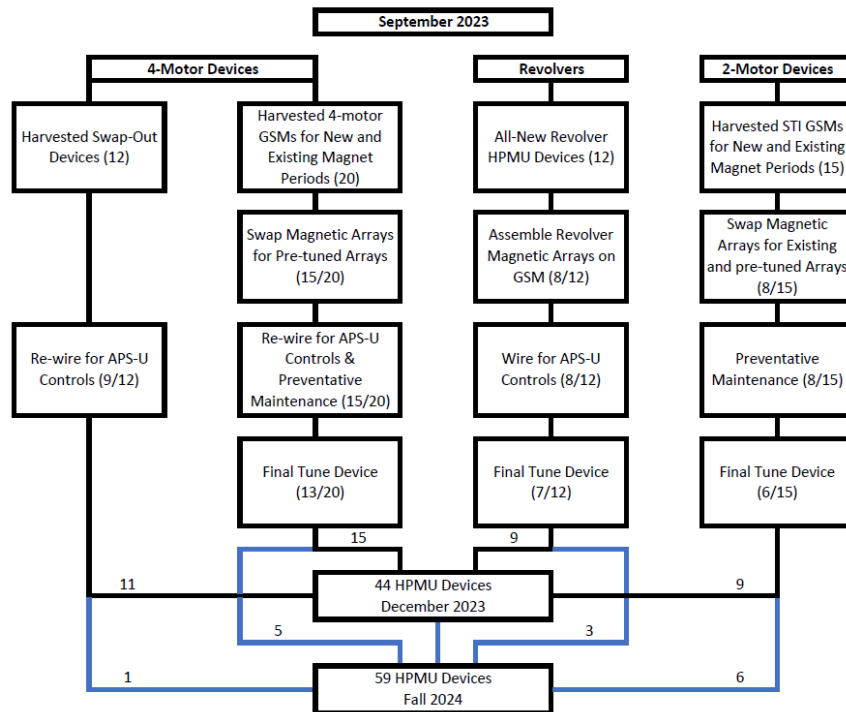
- Insertion Devices (IDs) are one of the primary sources of X-ray radiation for APS beamlines
- Hybrid Planar Magnet Undulator (HPMU) are the most common type of insertion device at the APS
- Magnetic periods have been optimized for APS-U ID beamline needs
- 5 new undulator magnet periods
 - (1.35cm, 1.4cm, 2.1cm, 2.5cm 2.8cm)
- 12 all-new revolver HPMU Insertion Devices
 - (2 unique magnet periods on one insertion device)
- New device gap controls (Stepper to Servo)
- Every device is magnetically tuned to APS-U specifications
 - Assembly → Tuning → Installation



HPMU INSERTION DEVICES FOR APS-U

APS-U HPMU Insertion Devices Progress

- 49 HPMU devices removed from the APS Storage Ring in May over 3 days
- 48/48 Canting Magnets procured
- 11/11 Phase Shifters procured
- 28/35 Single Period HPMU devices tuned and ready for installation
- 7/9 Revolver HPMU Devices tuned and ready for installation



HPMU INSERTION DEVICES FOR APS-U



HPMU INSERTION DEVICES FOR APS-U

- 44 devices in 33 sectors by December 2023
- All 59 devices installed as beamlines come online in 2024
- Every device receives preventative maintenance and is tuned by Magnetic Measurement staff
 - Phase errors are routinely below APS-U target value of $< 3^\circ$
- Industry standard servo controls replace obsolete stepper motor components

