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Beam Measurements during Swap-out Injection of the APS-U Storage Ring

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The Advanced Photon Source Upgrade (APS-U) implements a novel swap-out injection scheme. To comprehensively characterize the beam dynamics during swap-out injections, approximately 20 Beam Position Monitors (BPMs) in the initial sections of the storage ring have been equipped with high-precision single-bunch electronics. These systems are capable of measuring the turn-by-turn positions of the injecting bunch. Using similar techniques, the longitudinal phase and energy of the injecting bunch can be accurately assessed. Additionally, bunch-by-bunch feedback systems have been used to measure transient beam motions, extending their primary functionality of suppressing coupled bunch instabilities. This paper presents the results of beam measurements during swap-out injections utilizing these advanced systems.

Footnotes

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