

Survey and Alignment for the APS Upgrade Storage Ring

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The Advanced Photon Source (APS) is a synchrotron X-ray facility located at Argonne National Laboratory, in operation since 1996. The APS recently completed an extensive upgrade, replacing the original APS electron storage ring with a state-of-the-art multi-bend achromat machine. The upgraded storage ring generates X-rays up to 500 times brighter than the original ring.

After more than 25 years of operation, the original APS storage ring was shut down on April 24, 2023, disassembled and removed. New, pre-assembled storage ring modules were installed, and electrons were injected into the new ring on April 13, 2024, less than one year later. The first stored electron beam was achieved on April 20, 2024.

In this paper we summarize the years of planning and preparation needed to successfully accomplish the goal replacing the 1,104-meter circumference storage ring within a one-year window. Magnet fiducialization, module assembly, survey control, and module installation and alignment will be presented.

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