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## Commissioning of the Advanced Photon Source Upgrade – the first swap-out injection-based synchrotron light source

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The Advanced Photon Source (APS) recently completed a transformative upgrade, replacing its 25-year-old storage ring with a state-of-the-art hybrid seven-bend achromat lattice with six additional reverse bends. The new design features a low natural emittance of 42 pm-rad, enabling productions of X-rays up to 500 times brighter than the original APS. The upgrade introduced a pioneering swap-out injection scheme, replacing entire depleted bunches rather than topping them up. This approach enables on-axis injection to accommodate for the reduced dynamic aperture resulting from strong focusing. The paper describes the commissioning process, operating experience with swap-out injection, and gives performance parameters of new systems such as the bunch-lengthening cavity.

### Footnotes

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LaTeX

### Region represented

America

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