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Design of an X-Undulator

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The Advanced Photon Source Upgrade (APS-U) will deliver a new storage ring based on a Multi-Bend Achromat (MBA) lattice featuring swap-out on-axis injection, enabling the use of small diameter insertion device vacuum chambers. To leverage this advantage, we designed an X-undulator similar to the APPLE-X undulator but with a fixed gap and additional simpler magnet arrays for force compensation. The X-undulator is a pure permanent-magnet-based polarization variable undulator with a 30 mm period length and an 8.5 mm diameter bore in the beam center. The gaps between neighboring undulator magnetic arrays are 3 mm. Variation of the radiation wavelength and polarization is achieved using the longitudinal motion of the undulator magnetic arrays. This contribution covers the magnetic and mechanical design, as well as the optimization of this X-undulator.

Footnotes

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