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Design of an APS electromagnetic undulator for generating variably polarized soft x-ray radiation

P. Ivanov, E. Gluskin, L. Moog, S. Sasaki, E. Trakhtenberg, I. Vasserman, and R. Apparao

Advanced Photon Source, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439

A new type of electromagnetic undulator for generating radiation in the soft X-ray region has been designed for the Advanced Photon Source. This 12.8 cm period undulator generates homogeneous horizontal magnetic fields as well as vertical fields even though it has no magnetic structure in the particle orbit plane. This device is capable of generating brilliant radiation that is circularly polarized or linearly polarized in either the vertical or the horizontal plane, in the energy range between 500 eV and 3.5 keV. The handedness of the circular polarization can be switched at frequencies up to 10 Hz. Three-dimensional magnetic field calculations are being used to fine-tune the design.

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