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Diagnosing an in-vacuum undulator in the ALS storage ring

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The Advanced Light Source (ALS) has an in-vacuum undulator aptly named “Leda,” after the Greek “Mother of Light.” It was installed in 2019 and provides high-brightness, high-energy photons for the ALS macromolecular crystallography beamline, Gemini. The undulator is a hybrid design with a minimum gap of 4.3 mm, a magnetic period of 15 mm, and a photon energy range of 5–19 keV. When the device was commissioned in the ALS storage ring, it had a negligible impact on ring operations. Recently, there has been a measured degradation in storage ring performance correlated with the Leda gap. Prior to conducting an invasive magnetic measurement, we performed a suite of beam-based measurements to characterize Leda. Herein, we detail these measurements and share them with the accelerator community, who may find them useful when encountering similar challenges.

Footnotes

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