Investigation of the Earth Field Effect on the Insertion Device Performance at the Advanced Photon Storage Ring [1]

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The contribution of the horizontal Earth field component at the median plane of the insertion device was calculated and compared at the Advanced Photon Source Magnetic Measurement Facility. The orientation of the device in a storage ring (SR) affects the field integrals as much as 55 G-cm for $J1_x$ at open gap, 30 G-cm for closed gap, and 70 G-cm for $J1_y$ at closed gap due to the Earth field contribution. As a result, the tuning at MM1 remains valid only for devices with the same orientation in the SR. Multipole components of field integrals are affected as well, especially in a vertical direction.

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