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Impact of beam screen eddy currents on transition crossing in the EIC HSR

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The Electron Ion Collider (EIC) hadron storage ring (HSR) requires a beam screen made of 75 μm copper layer on top of a 1 mm thick 316LN stainless steel sheet. The eddy currents produced by the dynamic fields at the beam screens of the transition jump quadrupoles will increase the field response delay. The field response curve depends on the thickness and Residual Resistivity Ratio (RRR) value of the copper layer. Manufacturing variances of thickness and RRR in the beam screens of the gamma transition quadrupole will result in different field response delays. This paper summarizes the effects from the beam screens on transition crossing. From the varying delays, the beta-wave and eta-wave may exceed typical RHIC values. The effectiveness of the jump will be estimated using simulations of the existing RHIC lattice.

Footnotes

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