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Lattice design for the interaction region of the electron-ion collider

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We present the lattice design for the interaction region (IR) for the Electron-Ion Collider. We specify the requirements that the IR must meet, both for the hadron and electron beams themselves and for the collision products and radiation that must be transmitted through the magnet apertures. We align the hadron magnets downstream of the detector to pass the collision products while minimizing stray fields in the electron line. We set the fields and gradients in the magnets near the IR to meet the required specifications at both the interaction point and the crab cavities. We describe how these magnet placements can be implemented in accelerator design codes. We match the hadron IR to the existing RHIC arcs, and describe the consequences for the spin manipulation snake and rotators.

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Footnotes

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