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Electron polarization preservation in the EIC

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Polarization levels in the Electron Storage Ring (ESR) of the Electron-Ion Collider (EIC) must be maintained for a sufficient time before depolarized bunches are replaced. The depolarizing effects of synchrotron radiation can be minimized with spin matching, however the optics requirements for the ring must still be satisfied. Furthermore, the robustness of the polarization in the presence of misalignments, beam-beam effects, and the eventual insertion of a vertical emittance creator –necessary to match the electron and ion beam sizes at the interaction point –must be ensured. In this work, the results of various polarization analyses of the ESR lattices are presented, and their implications discussed; the necessity for a longitudinal spin match in the 18 GeV case is investigated, and vertical emittance creation schemes with minimal effects on polarization are analyzed.

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Footnotes

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Yes

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