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# High polarization in the EIC-ESR using the BAGELS method

*Monday 2 June 2025 16:00 (2 hours)*

The Electron-Ion Collider (EIC) to be built at Brookhaven National Laboratory will be the first collider of longitudinally-spin-polarized electrons with longitudinally-spin-polarized ions for a wide range of energies. In the Electron Storage Ring (ESR) of the EIC, the minimization of radiative depolarization faces several significant challenges, including engineering limitations, the necessity for a vertical emittance creator for beam size matching, and the necessity to correct both the orbit/optics and polarization in the real ring including random closed orbit distortions. The new "Best Adjustment Groups for ELectron Spin"(BAGELS) method has been recently formulated to solve all such problems. We use the BAGELS method to calculate four special vertical orbit bumps, which are used to significantly increase asymptotic polarization in the ideal 1- and 2-IP ESR lattices, and to correct the polarization with random errors. We also calculate "polarization-safe"knobs that can be used to correct delocalized coupling caused by the random errors, and to create the sufficient vertical emittance, all while having minimal impacts on the polarization.

## Footnotes

## Paper preparation format

LaTeX

## Region represented

America

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**Author:** SIGNORELLI, Matthew (Cornell University (CLASSE))

**Co-author:** HOFFSTAETTER, Georg (Cornell University (CLASSE))

**Presenter:** SIGNORELLI, Matthew (Cornell University (CLASSE))

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