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## **Generation of Vertical Emittance through Transverse Coupling and its Impact on the Polarization in the EIC ESR**

*Monday, 8 May 2023 16:30 (2 hours)*

One of the design requirements to reach a high luminosity in the Electron Ion Collider (EIC) is the collision of matched spot sizes of hadron and electron beams at the IP, with a horizontal to vertical emittance ratio of up to almost 20. However, the natural vertical emittance of electron beams in the Electron Storage Ring (ESR) in EIC is a few orders of magnitude smaller than the horizontal one. Increasing the vertical beta function at the IP to reach the necessary vertical beam size may not be acceptable due to the associated growth of the beam-beam tune shift. We explore an approach to generate the vertical emittance through the transverse coupling using skew quadrupoles in one of ESR arcs, while keeping the rest of the ESR decoupled. In this paper, we present the study results on the modification of ESR optics, evaluation of the dependence of electron polarization on the excited vertical emittance and minimization of the depolarization through the spin match mechanism.

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### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

**Primary author:** LIN, Fanglei (Oak Ridge National Laboratory)

**Co-authors:** PTITSYN, Vadim (Brookhaven National Laboratory (BNL)); MOROZOV, Vasilii (Oak Ridge National Laboratory)

**Presenters:** LIN, Fanglei (Oak Ridge National Laboratory); PTITSYN, Vadim (Brookhaven National Laboratory (BNL)); MOROZOV, Vasilii (Oak Ridge National Laboratory)

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