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## Data driven methods to recognize patterns in EIC weak-strong simulation

*Wednesday 4 June 2025 16:00 (2 hours)*

Beam-Beam simulations are currently being studied in preparation for future EIC experiments to study beam-beam effects and, in turn, maximize luminosity. Weak-strong methods are studied for single-particle dynamics during collision. 1 million macro-particles for 1 million turns are typically tracked, corresponding to only 10 seconds in the EIC. The goal of this study is to predict beam properties over the scale of hours. A potential solution focuses on using data-driven methods such as machine learning methods to analyze and extend the insights of the beam properties such as long-term nonlinear effects. This would aid in long-term predictions where results would be more efficiently acquired than a typical tracking simulation. Some limitations such as inaccurate predictions and spatial complexity are also discussed. These methods can then be applied to strong-strong simulations in the future studies.

### Footnotes

### Paper preparation format

LaTeX

### Region represented

America

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