

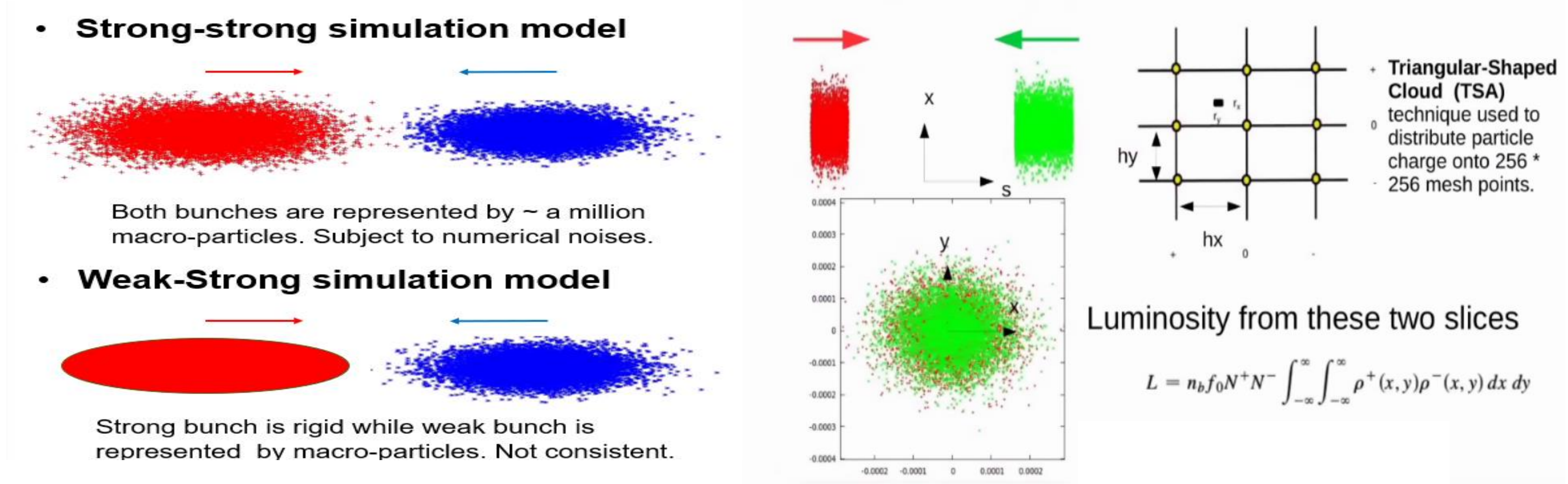
Beam-Beam Simulation Models and Numerical Noises for Flat-Beam Collisions in the Electron-Ion Collider

Abstract 12

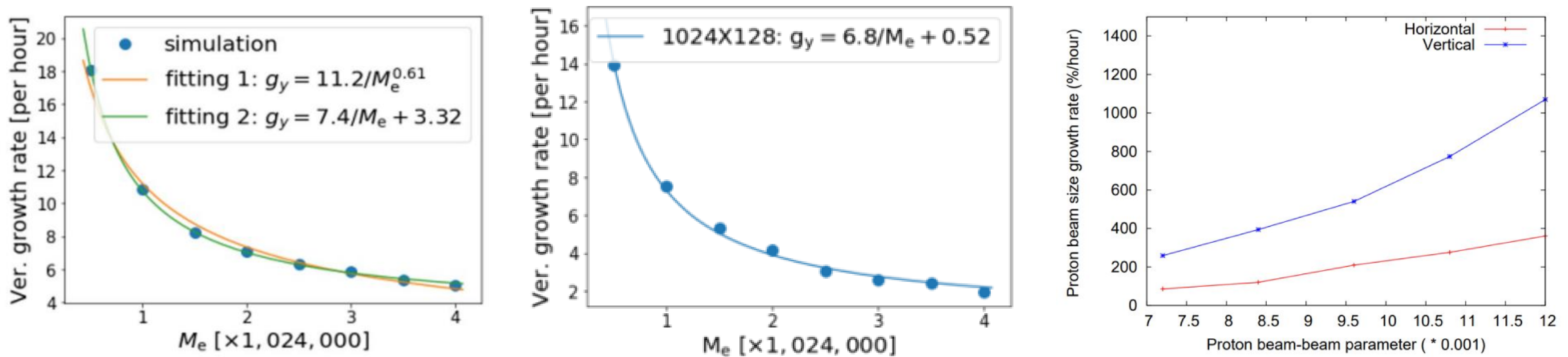
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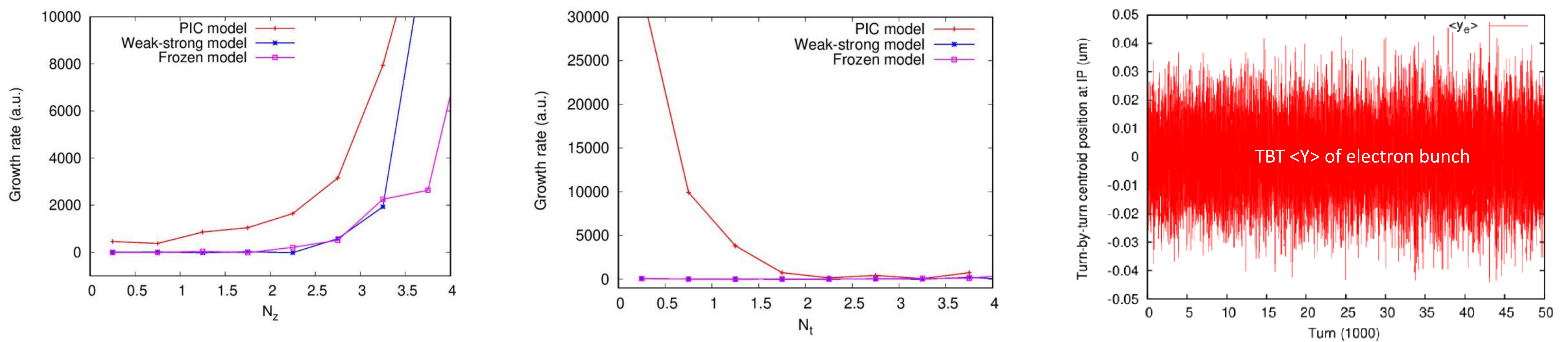
1. Strong-strong Beam-beam Simulation Models and Particle-In-Cell (PIC) Method



2. Scaling laws of Numerical Noise in S-S Beam-beam Simulation for flat-beam collision

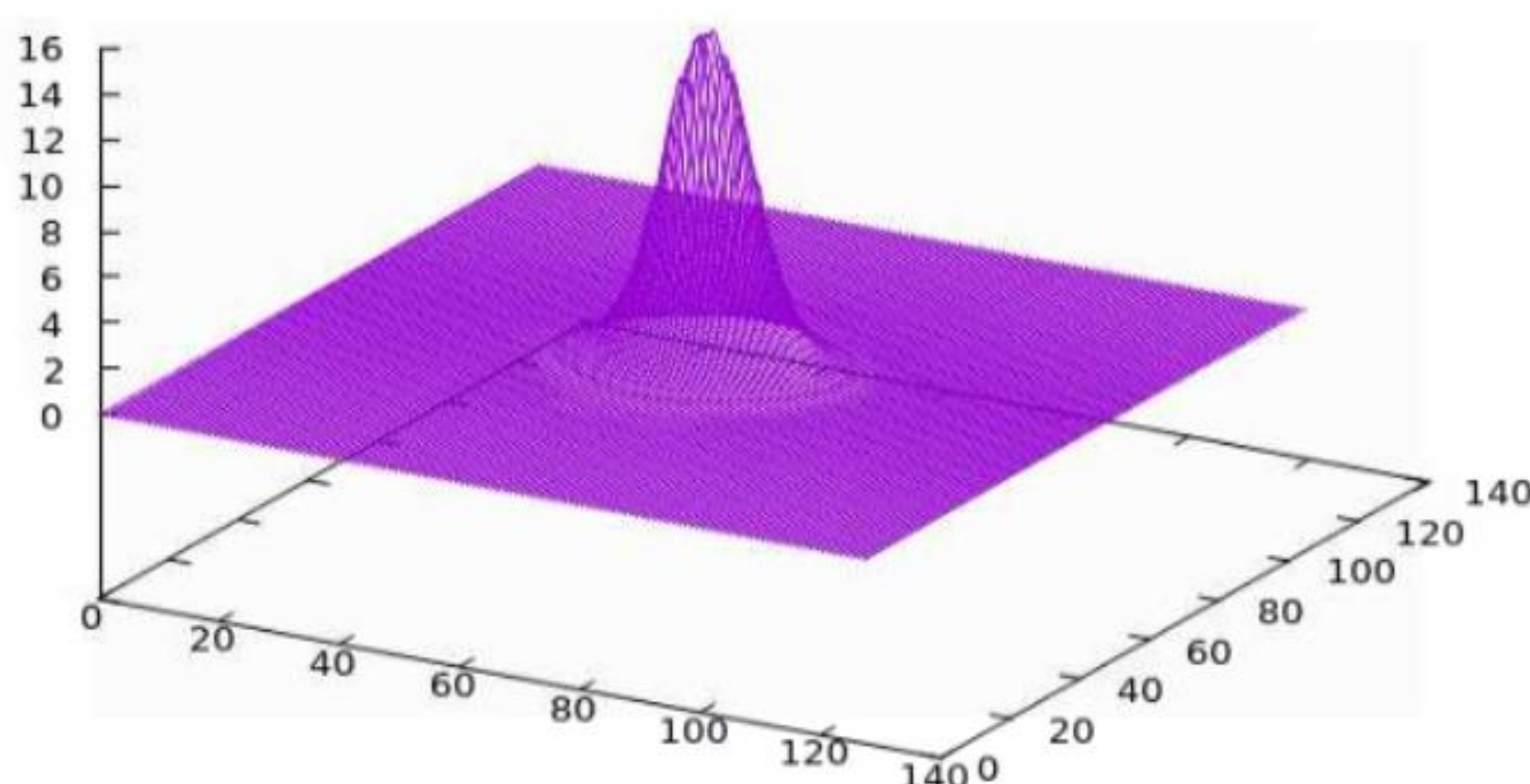


3. Sources of Numerical Noise in Strong-strong Beam-beam Simulation with PIC

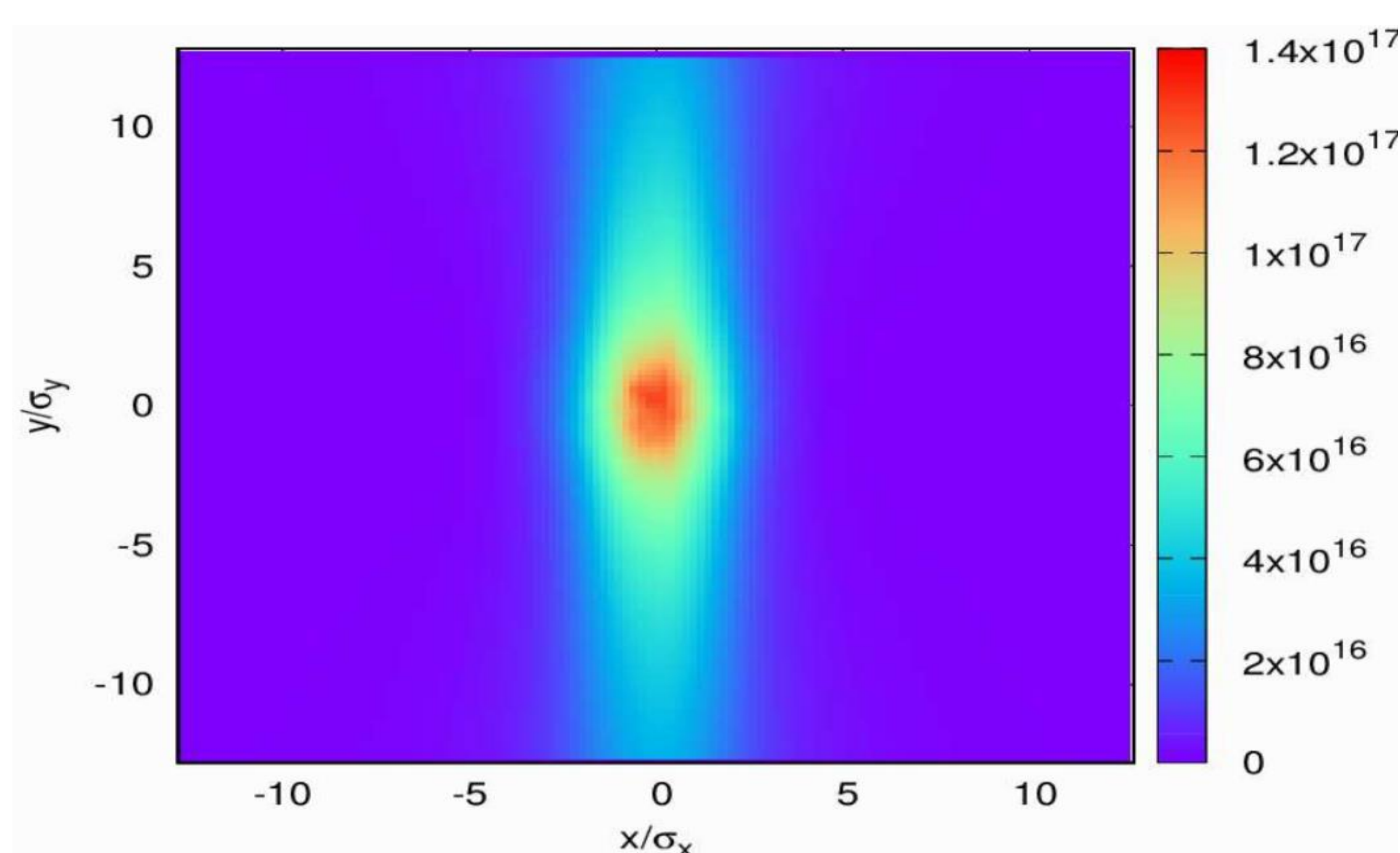


Emittance growth as function of long. amplitude

Emittance growth as function of trans. amplitude



Variation of charge density on grids in 1000 turns



Variation of vertical kick on grids in 1000 turns

4. Summary

We observed large artificial emittance growth in strong-strong beam-beam simulation for flat-beam collision in EIC. We attribute this to numerical noise associated with PIC algorithm.

5. References

- D. Xu, et al, NAPAC2022, MOYD4.
- Y. Luo, et al, IPAC2022, WEPOPT038.
- Y. Luo, et al, IPAC2022, WEPOPT040.
- Y. Luo, et al, IPAC2022, WEPOPT036