Contribution ID: 5

Accelerating Relativistic Heavy-Ion Collision Modeling: Machine Learning Integration with the iHKM Framework

Thursday, 12 June 2025 15:40 (20 minutes)

The integrated HydroKinetic Model (iHKM) is a key tool for simulating the complex dynamics of relativistic heavy-ion collisions. However, full-scale iHKM simulations are computationally demanding. This work presents a novel approach combining machine learning with iHKM to both infer optimal model parameters (such as viscosity and relaxation time) from experimental data and to approximate full simulation results with high speed and accuracy. The synergy of physics-based modeling and AI significantly accelerates the analysis pipeline, offering new possibilities for exploring collision energy regimes. The methodology and its validation on experimental datasets will be discussed.

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Session Classification: Artificial Intelligence in Physics

Track Classification: Artificial Intelligence in Physics