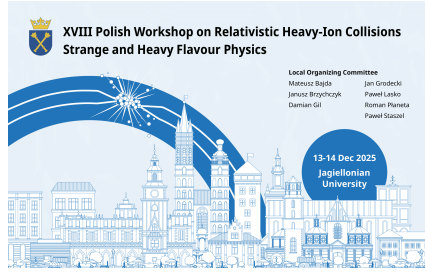


# XVIII Polish Workshop on Relativistic Heavy-Ion Collisions: Strange and Heavy Flavour Physics



Contribution ID: 33

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## Neural network enhanced Bayesian global analysis of EKRT+viscous hydrodynamics model of relativistic heavy ion collisions

*Sunday 14 December 2025 10:25 (15 minutes)*

In this talk I present a Bayesian global analysis of a (2+1)-d viscous hydrodynamics model with event-by-event EKRT initial state describing simultaneously four collision systems: Au+Au collisions at  $\sqrt{s_{NN}} = 200$  GeV, Pb+Pb collisions at 2.76 TeV and 5.02 TeV, and Xe+Xe collisions at 5.44 TeV. To make the analysis computationally feasible, two layers of model emulation are utilized: First, neural networks are used to estimate model output for a single event, which allows us to evaluate hundreds of thousands of events with reasonable computational resources. Based on these single-event neural network computations, Gaussian process emulators are then trained to produce estimates for the event-averaged output which can be compared with the experimental data. This procedure allows us to obtain constraints on the temperature dependence of shear and bulk viscosities for the QCD medium formed in relativistic heavy ion collisions.

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