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New constraints of QCD matter from improved Bayesian parameter estimation with the latest LHC data

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Transport properties of the matter created in heavy-ion collisions, the quark-gluon plasma (QGP), contain essential information about quantum chromodynamics (QCD). In this talk, we present our latest study in inferring the transport properties of QGP by an improved Bayesian analysis using the CERN Large Hadron Collider Pb-Pb data. The uncertainties of the extracted properties are reduced by adding new observables sensitive to specific shear and bulk viscosity, reflecting mostly nonlinear hydrodynamic responses. The analysis also reveals that higher-order harmonic flows and their correlations have a higher sensitivity to the transport properties than other observables. This observation shows the necessity of accurate measurements of these observables including heavy quarks in the future.

Based on:

[1] J.E. Parkkila, A. Onnerstad, D.J. Kim, Phys.Rev.C 104 (2021) 5, 054904, arXiv: 2106.05019 [hep-ph]

[2] J.E. Parkkila, A. Onnerstad, S. F. Taghavi, C. Mordasini, A. Bilandzic, D.J. Kim, arXiv: 2111.08145 [hep-ph]

Present via

Offline

Primary authors: ONNERSTAD, Anna (University of Jyväskylä (FI)); KIM, Dong Jo (University of Jyvaskyla (FI)); PARKKILA, Jasper (CERN)

Presenter: KIM, Dong Jo (University of Jyvaskyla (FI))

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