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Identifying the QCD transition with deep learning

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The state-of-the-art pattern recognition method in machine learning (deep convolution neural network) is used to identify the equation of state (EoS) employed in the relativistic hydrodynamic simulations of heavy ion collisions. High-level correlations of particle spectra in transverse momentum and azimuthal angle learned by the network act as an effective EoS-meter in deciphering the nature of the phase transition in QCD. The EoS-meter is model independent and insensitive to other simulation inputs including the initial conditions and shear viscosity for hydrodynamic simulations. Through this study we demonstrate that there is a traceable encoder of the dynamical information from the phase structure that survives the evolution and exists in the final snapshot of heavy ion collisions and one can exclusively and effectively decode these information from the highly complex final output with machine learning when traditional methods fail

Content type

Theory

Collaboration

Centralised submission by Collaboration

Presenter name already specified

Primary authors: Dr PANG, Long-Gang (Physics department of UC Berkeley); Dr ZHOU, Kai (FIAS, Goethe-University Frankfurt am Main); Dr SU, Nan (Frankfurt Institute for Advanced Studies); PETERSEN, Hannah; STOECKER, Horst (GSi); WANG, Xin-Nian (Lawrence Berkeley National Lab. (US))

Presenter: Dr PANG, Long-Gang (Physics department of UC Berkeley)

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