Contribution ID: **170** Type: **Oral**

Neural network extraction of chromo-electric and chromo-magnetic gluon masses

Monday, 27 October 2025 09:40 (20 minutes)

We present a neural network-based quasi-particle model to separate the contributions of chromo-electric and chromo-magnetic gluons. Using dual residual networks, we extract temperature-dependent masses from SU(3) lattice thermodynamic data of pressure and trace anomaly. After incorporating physics regularizations, the trained models reproduce lattice results with high accuracy over $T/T_c \in [1, 10]$, capturing both the crossover behavior near T_c and linear scaling at high temperatures. The extracted masses exhibit a physically reasonable behavior: they decrease sharply around T_c and increase linearly thereafter. We find significant differences between thermal and screening masses near T_c, reflecting non-perturbative dynamics, while they converge at T
$gtrsim 2T_c$.

Primary authors: MEI, Jie (中国科学院大学物理科学学院); Prof. WANG, Lingxiao (Riken); Prof. HUANG, Mei (中国科学院大学核科学与技术学院)

Presenter: MEI, Jie (中国科学院大学物理科学学院)

Session Classification: Parallel I

Track Classification: QCD 相变与状态方程 (QCD phase transition and equation of state)