## The complex structure of strong interactions in Euclidean and Minkowski space

Contribution ID: 25

Type: Contributed talk

## S-matrix approach to the Thermodynamics of Hadrons

Tuesday 27 May 2025 14:15 (30 minutes)

I will present how the S-matrix formalism enables a model-independent description of hadronic matter by linking scattering phase shifts to an effective density of states. This approach naturally incorporates broad resonances and repulsive interactions, offering a robust framework for thermal QCD.

Applied to the LHC proton yield anomaly, it helps resolve the "proton puzzle" by capturing essential features of the baryon spectrum, with direct implications for lattice QCD observables like baryon-charge correlations.

I will also highlight new insights into in-medium effects, particularly three-body forces in the S = -2, -3 sector, and their role in shaping QCD susceptibilities.

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