



Contribution ID: 198

Type: **not specified**

Martin Kruczenski "The Gauge Theory Bootstrap: Predicting pion dynamics from QCD"

Wednesday, November 19, 2025 3:30 PM (1 hour)

Abstract: The Gauge Theory Bootstrap computes the strongly coupled pion dynamics by considering the most general scattering matrix, form factors and spectral densities and matching them with perturbative QCD at high energy and with weakly coupled pions at low energy. In this talk (based on <https://arxiv.org/abs/2505.19332> with Yifei He, ENS, Paris), we show that further constraints on the spectral densities significantly reduce the possible solutions to a small set of qualitatively similar ones. Quantitatively, the precise solution is controlled by the asymptotic value of the form factors and SVZ sum rules. We also introduce an iterative procedure that, starting from a generic feasible point, converges to a unique solution parameterized by the UV input. For the converged solution we compute masses and widths of resonances that appear, scattering lengths and effective ranges of partial waves, low energy coefficients in the effective action. Additionally, we use these results to discuss the thermodynamics of a pion gas including pair correlations of pions with same and opposite charge.