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Bounds on QCD observables: hadronic strings, glueball scattering, and meson spectrum

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The numerical S-matrix Bootstrap establishes non-perturbative universal bounds on physical observables extracted from scattering amplitudes in any dimension.
Often, from a bound, it is possible to extract the extremal amplitudes and learn valuable lessons on non-perturbative physics.
In this talk, I will review some of the most recent applications of Bootstrap to QCD observables.
First, I will discuss the bounds on the quark-antiquark potential in 3d and 4d, and show how the QCD world-sheet axion emerges from the extremal amplitudes.
Next, I will focus on the bounds of coupling constants among SU(3) glueballs that rely only on rigorous properties of QFTs in four dimensions.
Finally, I will briefly show some preliminary results obtained by injecting the experimentally available data on \pi\pi scattering.
The goal is to start a precision physics program for hadronic physics based on bootstrap methods.

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