

Dyson-Schwinger calculations for hadron spectroscopy and structure

I will present recent progress in the calculation of nucleon resonances using the framework of Dyson-Schwinger and Bethe-Salpeter equations. The resulting mass spectra are obtained both from the three-body bound-state equation as well as its quark-diquark approximation starting from the level of QCD's dressed propagators and vertices. The resulting nucleon resonance spectrum agrees one-to-one with experiment, provided well-known deficiencies of the rainbow-ladder approximation are compensated for. The advancements and challenges with functional methods in the extraction of resonance properties will be discussed in comparison with analogous efforts in lattice QCD. I will show results for the Roper resonance as the nucleon's first radial excitation, together with other resonances and their structure properties including electromagnetic transition form factors.