Contribution ID: **4** Type: **Invited talk**

Born-Oppenheimer Approximation for Hidden-Heavy Exotic Hadrons

Tuesday, 2 July 2024 12:20 (30 minutes)

In this talk, I will show that the Born-Oppenheimer approximation for QCD provides a rigorous and unified framework for the study of conventional and exotic hidden-heavy hadrons. In this approximation, a hidden-heavy hadron corresponds to an energy level in a potential that increases linearly at large interquark distances. The spectrum of the lowest confining potential contains conventional quarkonium states. The spectra of excited confining potentials contain exotic states such as quarkonium hybrids. Pairs of heavy hadrons, on the other hand, correspond to energy levels in potentials that approach a constant at large interquark distances. Their spectra contain continua of hadron-pair scattering states and may also contain discrete states associated with hadronic molecules. Strong decays of hidden-heavy hadrons into pairs of heavy hadrons are mediated by transitions between the corresponding Born-Oppenheimer potentials, which are constrained by cylindrical and heavy-quark-spin symmetries.

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Session Classification: Talks