



Contribution ID: 102

Type: 1st and 2nd weeks (Hadron structure and interactions)

## Nonrelativistic Effective field theories of QCD with application to the study of XYZ exotics states

*Thursday, October 24, 2024 9:00 AM (1h 30m)*

Nonrelativistic bound states lie at the core of quantum physics, permeating the fabric of nature across diverse realms, spanning particle to nuclear physics, and from condensed matter to astrophysics. These systems are pivotal in addressing contemporary challenges at the forefront of particle physics. Characterized by distinct energy scales, they serve as unique probes of complex environments. Historically, their incorporation into quantum field theory was fraught with difficulty until the emergence of nonrelativistic effective field theories (NREFTs).

In this lecture we will introduce the QCD nonrelativistic effective field theories called nonrelativistic QCD and potential NRQCD and show how they are the most appropriate tool to treat heavy quark bound states. pNRQCD in particular allows to obtain the Schroedinger equation as zero order problem from QCD. We will show that a generalization of pNRQCD, called Born-Oppenheimer EFT, allows us to address the newly discovered XYZ exotics state in the same, QCD derived, framework.

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