

Exploring the Spectrum of Heavy Quarkonium Hybrids with QCD Sum Rules

In recent years, many unanticipated hadrons have been discovered by the Babar, Belle, CLEO, D0 and LHCb experiments. These hadrons exist among conventional heavy quarkonium mesons (*i.e.* charmonia and bottomonia) and are referred to as heavy quarkonium-like or XYZ states. Because many of the XYZ states are difficult to interpret as charmonium or bottomonium mesons, they are widely considered to be exotic hadrons. Hybrid mesons, which are mesons that include explicit gluonic degrees of freedom, are one such possibility. The masses of heavy quarkonium hybrids can be predicted using the techniques of QCD sum rules, helping to ascertain the identities of the XYZ states. In this talk, I will provide a brief overview of the XYZ states, exotic hadrons and QCD sum rules. I will also discuss our recent work in which heavy quarkonium hybrid masses were determined for a large number of distinct J^{PC} channels using QCD sum rules. Our results will be compared to those of other theoretical approaches, such as lattice QCD. I will also discuss the implications of our work for the XYZ states.

Presenter: Robin Kleiv, robin.kleiv@ufv.ca (University of the Fraser Valley)

Authors: R.T. Kleiv, B. Bulthuis, D. Harnett, J. Ho, T. Richards (University of the Fraser Valley); Wei Chen, T.G. Steele (University of Saskatchewan); Shi-Lin Zhu (Peking University).