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Decays of Exotic Double-Heavy Hadrons into Pairs of Heavy Hadrons

Tuesday 14 May 2024 17:00 (15 minutes)

Until recently, it was widely believed that every hadron is a composite state of either three quarks or one quark and one antiquark. In the last 20 years, dozens of exotic heavy hadrons have been discovered, and yet no theoretical scheme has unveiled the general pattern. For hadrons that contain more than one heavy quark or antiquark, the Born-Oppenheimer approximation for QCD provides a rigorous approach to the problem. In this approximation, a double-heavy hadron corresponds to an energy level in a potential that increases linearly at large interquark distances. Pairs of heavy hadrons, on the other hand, correspond to energy levels in potentials that approach a constant at large interquark distances. In this talk, I will discuss decays of double-heavy hadrons into pairs of heavy hadrons, which are mediated by couplings between the respective Born-Oppenheimer potentials. I will show that conventional and exotic double-heavy hadrons follow different decay patterns dictated by the symmetries of QCD with two static color sources. As case studies, I will compare selection rules and branching ratios for the decays of quarkonium and quarkonium-hybrid mesons into the lightest pairs of heavy mesons. I will also discuss the corresponding decays of double-heavy tetraquarks.

Mini Symposia (Invited Talks Only)

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