Contribution ID: **109** Type: **not specified**

"Hidden charm molecular states"

Tuesday, 16 September 2014 09:30 (30 minutes)

Among the newly observed structures in the heavy-quarkonium mass region, some have been proposed to be hadronic molecules. We investigate the consequences of heavy-quark flavor symmetry on these heavy meson hadronic molecules. The symmetry allows us to predict new hadronic molecules on one hand, and test the hadronic molecular assumption of the observed structures on the other hand. We explore the consequences of the flavor symmetry assuming the X(3872) and Zb(10610) as an isoscalar DDbar* and isovector BBbar* hadronic molecule, respectively. A series of hadronic molecules composed of heavy mesons are predicted. In particular, there is an isoscalar 1++ BBar* bound state with a mass about 10 580 MeV which may be searched for in the Y(1S,2S)π+π−π0 mass distribution; the isovector charmonium partners of the Zb(10610) and the Zb(10650) are also predicted, which probably corresponds to the very recently observed Zc(3900) and Zc(4025) resonances by the BESIII Collaboration.

On the other hand, owing to heavy antiquark-diquark symmetry, the doubly heavy baryons have approximately the same light-quark structure as the heavy antimesons. As a consequence, the existence of a heavy meson-antimeson molecule implies the possibility of a partner composed of a heavy meson and a doubly heavy baryon. These states are of special interest since they can be considered to be triply heavy pentaquarks.

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