

DK interaction as a doorway to manifestly exotic mesons

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In recent years, it is found that many of the newly discovered states cannot easily fit into the naïve quark model. Because some of them are located close to two body thresholds, they have been conjectured as molecular states. We propose that one way to unambiguously test such a picture is going to few body (greater than two) systems while the building blocks are the two body subsystems. The DK/DDK/DDDK systems provide one of the best playground for testing our proposal.

The $Ds_0^*(2317)$ is widely accepted as a DK molecule. Its existence indicates that the DK interaction is attractive and strong enough to form a bound state. A natural question is then whether the system will still bind with one or more D mesons added. In a series of recent works, we explored such possibilities and showed that the DDK three-body molecular state exists, with a mass around 4140 MeV and a width of about 10 MeV. Due to the doubly charmed and doubly charged nature, such a state is explicitly exotic. We have also performed a preliminary study of the strong decay of the DDK state and the existence of a DDDK molecule. In this talk, I will report on these studies.

References:

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