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A three body state with $J = 3$ in the $\rho B^* \bar{B}^*$ interaction

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Collaboration

Abstract content

Motivated by previous works in which the ρB^* and the $B^* \bar{B}^*$ interactions were studied, we calculate the interaction of the three-body system $\rho B^* \bar{B}^*$. We know that the ρB^* interaction in $J = 2$ is stronger than in any other possible spin, and also an attractive interaction was found in the $B^* \bar{B}^*$ system, producing in both cases a bound state. Then we search for a three-body bound state in the $\rho B^* \bar{B}^*$ system assuming that the $B^* \bar{B}^*$ is forming a cluster and letting the lighter ρ meson interact with the B-mesons always in a spin two configuration. This fact justifies the using of the Fixed Center approximation, and considering the $J = 2$ ρB^* interaction we find a $J = 3$ three body meson molecule solving the Faddeev equations. As a consequence of the strongly attractive two-body interaction in the different subsystems , a $J = 3$ three-body state is found, providing a prediction of an exotic state.

Based on "States of $\rho B^* \bar{B}^*$ with $J = 3$ within the Fixed Center Approximation to Faddeev equations" Eur. Phys. J. A in print. arXiv:1510.06570 [hep-ph].

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