

The $B_c \rightarrow J/\psi KD$ weak decay and its relation with the $D^*s_0(2317)$

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We study the presence of the $Ds_0(2317)$ resonance in the weak decay process: $B_c \rightarrow J/\psi KD$. We assume a weak interaction mechanism in which the b quark decays into a c anti- c (J/ψ) and anti- s via a W meson. In this process the c anti- s pair hadronizes and the possible final configurations considered are KD and ηD_s . We compute the interaction of these two meson channels in the chiral unitary approach. Then we consider the $Ds_0(2317)$ as mainly a KD molecular state, and we fit the parameters of the theory in order to get a bound state pole in the S -matrix at the experimental mass of the $Ds_0(2317)$. We also consider the possibility of an additional q anti- q component in the $Ds_0(2317)$, introducing a CDD pole in the potential that describes the interaction. In these possible scenarios we predict the ratio of the invariant mass distribution $(B_c \rightarrow J/\psi KD)/(B_c \rightarrow Ds_0(2317))$. In all cases the invariant mass distribution peaks very close to the KD threshold suggesting the presence of the $Ds_0(2317)$ resonance. Based on “ $D^*s_0(2317)^+$ in the decay of B_c into $J/\psi DK$ ”. Phys. Rev. D 93 (2016) no.5, 054028

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