

# The $B_c \rightarrow J/\psi KD$ weak decay and its relation with the $D_{s0}^*(2317)$ resonance

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## Collaboration

## Abstract content

We study the presence of the  $D_{s0}^*(2317)$  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  $c\bar{c}$  ( $J/\psi$ ) and  $\bar{s}$  via a  $W$  meson. In this process the  $c\bar{s}$  pair hadronizes and the possible final configurations considered are  $KD$  and  $\eta D_s$ . We compute the interaction of these two meson channels in the chiral unitary approach. Then we consider the  $D_{s0}^*(2317)$  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  $D_{s0}^*(2317)$ . We also consider the possibility of an additional  $q$  anti- $q$  component in the  $D_{s0}^*(2317)$ , introducing a CDD pole in the potential that describes the interaction. In these possible scenarios we predict the ratio of the invariant mass distribution ( $B_c \rightarrow J/\psi KD$ )/( $B_c \rightarrow D_{s0}^*(2317)$ ). In all cases the invariant mass distribution peaks very close to the  $KD$  threshold suggesting the presence of the  $D_{s0}^*(2317)$  resonance.

Based on “ $D_{s0}^*(2317)^+$  in the decay of  $B_c$  into  $J/\psi DK$ ”. Phys. Rev. D, in print. arXiv:1510.06316 [hep-ph].

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