

# Nature of the LHCb pentaquarks from an analysis of the $J/\Psi p$ spectrum

Tuesday, May 18, 2021 5:55 PM (20 minutes)

In this talk, we will present the results of a coupled-channel analysis of the  $J/\Psi p$  invariant mass distribution, in which the  $P_c$  states are treated as  $\Sigma_c^{(*)} \bar{D}^{(*)}$  molecules, [Phys. Rev. Lett., 124, 072001 (2020)] and its recent update [arXiv:2102.07159 [hep-ph]]. The effective  $\bar{D}^{(*)} \Sigma_c^{(*)}$  meson-baryon scattering potential involves the long-range one-pion exchange interactions and short-range operators constrained by heavy quark spin symmetry (HQSS) and renormalization group invariance. In addition to the  $J/\Psi p$ , the  $\Lambda_c \bar{D}^{(*)}$  and  $\eta_c p$  are included as explicit inelastic channels, as required by unitarity and HQSS. The approach yields a very good description of the data. Apart from the three established states, a new state, associated with the  $J^P = 3/2^-$   $\Sigma_c^* \bar{D}$  molecule and predicted from HQSS, has a clear manifestation in the data. The line shapes in the elastic and inelastic channels are predicted and will be important for revealing the decay properties of the  $P_c$  states and their quantum numbers, once new data become available.

## Collaboration

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