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Doubly charmed baryon decays in the quark model

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In 2022, doubly charmed baryon hadronic weak decay $\Xi_{cc}^{++} \rightarrow \Xi_c^{'+} \pi^+$ was first observed by LHCb and its branching fraction relative to $\Xi_{cc}^{++} \rightarrow \Xi_c^+ \pi^+$ was reported. In this talk we will introduce the study of charmed baryon decays $\Xi_{cc}^{++} \rightarrow \Xi_c^{'+} \pi^+$ within the framework of the nonrelativistic quark model (NRQM). Factorizable amplitudes in terms of transition form factors, while nonfactorizable amplitudes arising from the inner W emission are evaluated in the pole model combining current algebra and expressed in terms of baryonic matrix elements and axial-vector form factors. All the nonperturbative parameters are then calculated in NRQM, relying on the harmonic oscillator parameters α_ρ and α_λ for the ρ - and λ -mode excitation. The measured ratio between the two decay modes can be well explained and decay asymmetries are predicted to be -0.78 and -0.89 for $\Xi_c^+ \pi^+$ and $\Xi_c^{'+} \pi^+$, respectively. A comparison with other works will also be made.

Consent

I do not consent to recording/broadcasting of my presentation.

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