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Study of charmed baryons via their strong decay widths and mass spectra

The total decay widths of charmed baryons, including all the possible open-flavor decay channels, are calculated through the $^3P_0$ model. Furthermore, we calculate the masses of the charmed-baryon up to the D-wave in a constituent quark model, using the three-quark and quark-diquark schemes. We use a Hamiltonian model based on a harmonic oscillator potential plus a mass splitting term that encodes the spin, spin-orbit, isospin, and flavor interactions.

We have thoroughly propagated these uncertainties into our predicted charmed baryon masses and decay widths via a Monte Carlo bootstrap approach, which is often absent in other theoretical studies on this subject.

Our quantum number assignments and predictions of mass and strong-decay widths are in agreement with the available data. Thus, our results show the ability to guide future measurements in LHCb, Belle, and Belle II experiments.

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