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Physics Reach of Rare Charm Baryon Decays

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Rare $|\Delta c| = |\Delta u| = 1$ processes constitute unique flavor probes in the up-sector of the Standard Model. Semileptonic FCNC decays of charmed baryons, such as $\Lambda_c \rightarrow p\mu^+\mu^-$, offer a large set of clean null test observables such as CP-asymmetries, lepton-universality ratios, missing energy modes, lepton flavor violating modes and angular observables. In these observables any signal cleanly indicates Physics Beyond the Standard Model. A variety of rare charm baryon modes exists ($\Lambda_c \rightarrow p\mu^+\mu^-$, $\Xi_c^{0,+} \rightarrow \Sigma^{0,+}\mu^+\mu^-$, $\Xi_c^0 \rightarrow \Lambda^0\mu^+\mu^-$, $\Omega_c^0 \rightarrow \Xi^0\mu^+\mu^-$) and complements similar analyses of charmed meson decays.

Along with sizable charm production rates at current flavor facilities, null test searches provide a formidable road in the search for New Physics scenarios, such as leptoquarks, Z' - or SUSY-models. We present an overview of null test opportunities with rare charm baryon decays and give sensitivities to New Physics contributions.

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