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Searches for rare and forbidden kaon decays at the NA62 experiment at CERN

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The decay K+ -> pi+ nu nu-bar is highly suppressed in the Standard Model (SM), while its rate can be predicted with minimal theoretical uncertainty. The branching ratio for this decay is thus a sensitive probe of the flavor sector of the SM.; however, the smallness of this BR (8 x 10^-11) and challenging experimental signature make it very difficult to measure. The primary goal of the NA62 experiment at the CERN SPS is to measure BR(K+ -> pi+ nu nu-bar) with ~10% precision. This will require the observation of 10^13 K+ decays in the experiment's fiducial volume, as well as the use of high-performance systems for precision tracking, particle identification, and photon vetoing. These aspects of the experiment will also allow NA62 to carry out a rich program of searches for lepton flavor and/or number violating K+ decays. Such searches can probe new physics scenarios involving, for example, heavy Majorana neutrinos or R-parity violating SUSY. Part of the experimental apparatus was commissioned during a technical run in 2012; installation continues and data taking is expected to begin in late 2014. The physics prospects and the status of the NA62 experiment will be reviewed.

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