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Precision tests of the Standard Model with kaon decays at CERN

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Recent results and prospects for precision tests of the Standard Model in kaon decay in flight experiments at CERN are presented. A measurement of the ratio of leptonic decay rates of the charged kaon at a 0.4% precision constrains the parameter space of new physics models with extended Higgs sector, a fourth generation of quarks and leptons or sterile neutrinos.

Searches for heavy neutrino mass states and the dark photon in the $\sim 100 \text{ MeV}/c^2$ mass range based on samples collected in 2003-2007 are in progress and prospects will be discussed. The NA62 experiment starting in 2014 will search for a range of lepton number and lepton flavour violating decays of the charged kaon and the neutral pion at improved sensitivities down to $\sim 10^{-12}$, which will probe new physics scenarios involving heavy Majorana neutrinos or R-parity violating SUSY.

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