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Search for K+ decays to a lepton and invisible particles

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The NA62 experiment at CERN reports searches for K+ ⟶ e+N, K+⟶μ+N and K+⟶μ+νX decays, where N and X are massive invisible particles, using the 2016-2018 data set.
The N particle is assumed to be a heavy neutral lepton, and the results are expressed as upper limits of O(10−9) and O(10−8) of the neutrino mixing parameter |Ue4|2 and |Uμ4|2, improving on the earlier searches for heavy neutral lepton production and decays in the kinematically accessible mass range.
The X particle is considered a scalar or vector hidden sector mediator decaying to an invisible final state, and upper limits of the decay branching fraction for X masses in the range 10-370 MeV/c2 are reported for the first time, ranging from O(10−5) to O(10−7).
An improved upper limit of 1.0×10−6 is established at 90% CL on the K+⟶μ+νν^{-} branching fraction.

Working group

WG5

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