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Theory meets Experiment

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New results for searches of exotic decays with NA62 in beam-dump mode

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The NA62 experiment at CERN took data in 2016–2018 with the main goal of measuring the $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ decay.

In this talk we report on the search for visible decays of exotic mediators from data taken in “beam-dump” mode with the NA62 experiment. NA62 can be run as a “beam-dump” experiment by removing the kaon production target and moving the upstream collimators into a “closed” position. In this configuration 400 GeV protons are dumped on an absorber and New Physics (NP) particles, including dark photons, dark scalars and axion-like particles, may be produced and reach a decay volume beginning 80 m downstream of the absorber. More than 10^{17} protons on target have been collected in “beam-dump” mode by NA62 in 2021. Recent results from analysis of this data, with a particular emphasis on Dark Photon and Axion-like particle Models, are presented. We also report new results on the first NA62 search for long-lived NP particles decaying in flight to hadronic final states based on a blind analysis of a sample of 1.4×10^{17} protons on dump collected in 2021.

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