Contribution ID: **261** Type: **Parallel talk**

Physics Beyond the Standard Model with the NA62 experiment at CERN

Tuesday 29 August 2023 14:30 (15 minutes)

The NA62 experiment at CERN took data in 2016–2018 with the main goal of measuring the $K^+ \to \pi^+\nu\bar{\nu}$ decay. The NA62 dataset is also exploited to search for light feebly interacting particles produced in kaon decays. Searches for $K^+ \to e^+N$, $K^+ \to \mu^+N$ and $K^+ \to \mu^+\nu X$ decays, where N and X are massive invisible particles, are performed by NA62. The N particle is assumed to be a heavy neutral lepton, and the results are expressed as upper limits of $O(10^{-8})$ of the neutrino mixing parameter $|U_{\mu 4}|^2$. The X particle is considered a scalar or vector hidden sector mediator decaying to an invisible final state. Upper limits of the decay branching fraction for X masses in the range 10–370 MeV/c^2 are reported. An improved upper limit of 1.0×10^{-6} is established at 90% CL on the $K^+ \to \mu^+\nu\nu\nu$ branching fraction.

The NA62 experiment can be run as a "beam-dump experiment" by removing the Kaon production target and moving the upstream collimators into a "closed" position. More than 10^{17} protons on target have been collected in this way during a week-long data-taking campaign by the NA62 experiment. We report on the search for visible decays of exotic mediators from data taken in "beam-dump" mode, with a particular emphasis on Dark Photon and Axion-like particle Models.

Submitted on behalf of a Collaboration?

Yes

Author: ROSA, Ilaria (Universita Federico II e INFN Sezione di Napoli (IT))

Co-author: ROMANO, Angela (University of Birmingham (GB))

Presenter: ROSA, Ilaria (Universita Federico II e INFN Sezione di Napoli (IT))

Session Classification: Dark matter and its detection

Track Classification: Dark matter and its detection