Contribution ID: **221** Type: **Contributed talk**

Recent results from the NA62 experiment at CERN

Thursday, 11 July 2024 17:35 (20 minutes)

Rare kaon decays are among the most sensitive probes of both heavy and light new physics beyond the Standard Model description thanks to high precision of the Standard Model predictions, availability of very large datasets, and the relatively simple decay topologies. The NA62 experiment at CERN is a multi-purpose high-intensity kaon decay experiment, and carries out a broad rare-decay and hidden-sector physics programme. NA62 has collected a large sample of K^+ decays in flight during Run 1 in 2016-2018, and the ongoing Run 2 which started in 2021. Recent NA62 results on searches for hidden-sector mediators and searches for violation of lepton number and lepton flavour conservation in kaon decays based on the Run 1 dataset are presented.
In this talk NA62 also reports recent results from precision measurements of rare kaon and pion decays, using data collected in Run 1. A sample of $K^+ \to \pi^+\gamma\gamma$ decays was collected using a minimum-bias trigger, and the results include measurement of the branching ratio, study of the di-photon mass spectrum, and the first search for production and prompt decay of an axion-like particle with gluon coupling in the process $K^+ \to \pi^+ A$, $A \to \gamma\gamma$. A sample of $\pi^0 \to e^+e^-$ decay candidates was collected using a dedicated scaled down di-electron trigger, and a preliminary result of the branching fraction measurement is presented.
The NA62 experiment can be run as a beam-dump" experiment by removing the kaon production target and moving the upstream collimators into aclosed" 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.

session

K. Precision and New Physics

Primary author: ROSA, Ilaria

Co-author: ROMANO, Angela

Presenter: ROSA, Ilaria

Session Classification: K. Precision and New Physics