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## New Physics searches at the NA62 experiment

*Tuesday 23 September 2025 18:00 (20 minutes)*

“The NA62 experiment at CERN is designed to measure the highly-suppressed decay  $K^+ \rightarrow \pi^+ \nu^-$  and has collected a large sample of  $K^+$  and  $\pi^+$  decays in flight during Run 1 (2016–2018) and Run 2 (since 2021). Searches for the decays  $K^+ \rightarrow \pi^+ X$  and  $\pi^+ \rightarrow e^+ N$  are presented using data collected in 2016–2022 and 2017–2024, respectively. No signal excess is observed and the results are interpreted to constrain a range of New Physics scenarios. Upper limits on the  $K^+ \rightarrow \pi^+ X$  branching ratio are established at the  $10^{-11}$  level, providing constraints on dark photon, scalar and ALP couplings. From the search for heavy neutral lepton production in  $\pi^+ \rightarrow e^+ N$  decays of beam pions, upper limits of the extended neutrino mixing matrix element  $|U_{e4}|^2$  are established at the  $10^{-8}$  level over the heavy neutral lepton mass range 95–126 MeV/c<sup>2</sup>. ”

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**Session Classification:** Afternoon - 4