

NA62 K \rightarrow pi nu nu

Letizia Peruzzo

ETAP, Johannes Gutenberg Universität Mainz

The Golden Mode $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ at the NA62 Experiment

The $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ decay is a golden mode for flavour physics, thanks to the precise prediction of the branching ratio within the Standard Model (to less than 10^{-10}), and the high sensitivity to indirect effects of New Physics up to the highest mass scales. The NA62 experiment at the CERN SPS is a multi-purpose high-intensity kaon decay experiment, designed to study the $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ decay. Thanks to the large sample of K^+ decays collected since 2016, the NA62 experiment has performed the world's most precise measurement of the $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ decay so far. New results from a significantly improved analysis based on data taken in 2021–2022, after upgrades of the beam line and of the detectors, are presented. From the combined data sets 2016–2022, the $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ decay is observed for the first time with a significance exceeding 5σ .