

Precision measurements with Kaons at CERN

Tuesday, 7 June 2022 13:35 (25 minutes)

The NA62 experiment at CERN took data in 2016–2018 with the main goal of measuring the $K^+ \rightarrow \pi^+ \nu$ decay. The high-intensity fixed-target setup and the detector performance make the NA62 experiment particularly suited to investigate the Standard Model structure and its possible extensions with precision measurements of charged kaon decays.

Results from studies of the radiative kaon decays $K^+ \rightarrow \pi^0 e^+ \nu$ (Ke3g) are reported, using a data sample of $O(100k)$ Ke3g candidates with sub-percent background contaminations recorded in 2017–2018. Preliminary results with the most precise measurements of the Ke3g branching ratios and of T-asymmetry in the Ke3g decay are presented.

The flavour-changing neutral current decay $K^+ \rightarrow \pi^+ \mu^+ \mu^-$ is induced at the one-loop level in the Standard Model. Preliminary results from an analysis of the $K^+ \rightarrow \pi^+ \mu^+ \mu^-$ decay are reported, using a large sample of about 3×10^{12} kaon decays into two muons recorded with a downscaled di-muon trigger operating along with the main trigger. The most precise determination of the $K^+ \rightarrow \pi^+ \mu^+ \mu^-$ form factor parameters F_+ and F_+ has been made by NA62 using data collected in 2017 and 2018.

Preliminary results of the $K^\pm \rightarrow \mu^\pm \pi^0 \nu$ (Kmu400) decay first observation and analysis based on the NA48/2 data collected in 2003–2004 are also presented

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Session Classification: Symmetries, hyperon and neutrino session