

Precision measurements with Kaon decays at CERN

Tuesday, June 27, 2023 11:30 AM (30 minutes)

The NA62 experiment at CERN collected the world's largest dataset of charged kaon decays in 2016-2018, leading to the first measurement of the branching ratio of the ultra-rare $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ decay, based on 20 candidates. In this talk the NA62 experiment reports recent results from analyses of $K^+ \rightarrow \pi^0 e^+ \nu \gamma$, $K^+ \rightarrow \pi^+ \mu^+ \mu^-$ and $K^+ \rightarrow \pi^+ \gamma \gamma$ decays, using a data sample recorded in 2017-2018. The radiative kaon decay $K^+ \rightarrow \pi^0 e^+ \nu \gamma$ (Ke3g) is studied with a data sample of O(100k) Ke3g candidates with sub-percent background contaminations. Preliminary results with the most precise measurements of the Ke3g branching ratios and T-asymmetry are presented. The $K^+ \rightarrow \pi^+ \mu^+ \mu^-$ sample comprises about 27k signal events with negligible background contamination, and the presented analysis results include the most precise determination of the branching ratio and the form factor. The $K^+ \rightarrow \pi^+ \gamma \gamma$ sample contains about 4k signal events with 10% background contamination, and the analysis improves the precision of the branching ratio measurement by a factor of 3 with respect to the previous measurements.

Preliminary results of the $K^\pm \rightarrow \pi^0 \pi^0 \mu^\pm \nu$ (K00mu4) decay first observation and analysis based on the NA48/2 data collected in 2003-2004 are also presented.

Collaboration

NA62, NA48/2

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