

11th International Workshop on Ring Imaging Cherenkov Detectors (RICH2022)



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Particle identification with the NA62 RICH detector

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NA62 is a new generation kaon experiment at the CERN SPS aiming at measuring the branching ratio (BR) of the ultra-rare $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ decay with 10% accuracy.

One of main challenges of the experiment is the suppression of background decay channels with branching ratios up to 10 orders of magnitude higher than the signal and with similar experimental signatures, e.g. the background from the $K^+ \rightarrow \mu^+ \nu$ decay, where the muon is misidentified. To provide such suppression, a powerful particle identification (PID) is needed.

A key element of PID in NA62 is the Ring-Imaging Cherenkov (RICH) detector. According to the NA62 requirements, the RICH should identify μ^+ and π^+ with a muon rejection factor of at least 100. It also measures the arrival time of charged particles with a precision better than 100 ps and is one of the main components of the NA62 trigger system.

The RICH has successfully operated during the 2016-2018 data taking periods, being essential in the measurement of the $BR(K^+ \rightarrow \pi^+ \nu \bar{\nu})$. The detector was also used for searches for lepton flavor violation in 3-track kaon decays. The talk is concentrated on the π/μ and π/e separation directly measured with the data for the aforementioned decays.

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Session Classification: Pattern Recognition and data analysis

Track Classification: Pattern recognition and data analysis