

# The RICH detector of the NA62 experiment at CERN

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RICH is the Ring Imaging CHerenkov detector of the NA62 experiment designed to measure the branching fraction of the ultra rare  $K^+ \rightarrow \pi^+ \nu \bar{\nu}$  decay. The NA62 experiment took data in 2016-2018. An additional run is foreseen in 2021-2025 to complete the measurement. The RICH detector plays a fundamental role in the  $K^+ \rightarrow \pi^+ \nu \bar{\nu}$  selection rejecting background coming from muons. It features challenging design specifications, in particular a time resolution of 70 ps and a muon misidentification of less than  $10^{-2}$  in the momentum range 15-35 GeV/c. We describe the detector design and report on the achieved performance. In a long term prospect (>2026) NA62 is considering the possibility to increase the nominal beam intensity by a factor 4. The time resolution needed to match the incoming  $K^+$  and the outgoing  $\pi^+$  in  $K^+ \rightarrow \pi^+ \nu \bar{\nu}$  selection must scale accordingly.

## Funding information

**Author:** BUCCI, Francesca (Universita e INFN, Firenze (IT))

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