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The kaon identification system in the NA62 experiment at CERN SPS

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The CERN experiment NA62 is dedicated to the study of ultra-rare decays of the K^+ in the pursuit of physics effects beyond the standard model (SM). The flagship decay $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ has a branching fraction (BF) predicted by the SM to be $(7.81 \pm 0.75 \pm 0.29) \times 10^{-11}$ and the collaboration will identify more than 100 such decays during data-taking in 2015-17 to enable a measurement of the BF to better than 10%. The necessary high number of K^+ decays is obtained by exploiting an unseparated monochromatic (75 GeV/c) beam of charged particles of flux 800 MHz, of which 50 MHz are K^+ . Kaons are identified with more than 95% efficiency, a time resolution of better than 100 ps, and misidentification of less than 10^{-4} using KTAG, a differential Cherenkov detector that makes use of the gas volume and optics of a CERN CEDAR counter. KTAG utilises 8 sets of 48 Hamamatsu PMTs, of which 32 (16) are of type 9880 (7400), with signals fed directly to the differential inputs of NINO front-end boards and thence to TDC boards within the TEL62 system. Leading and trailing edges of the discriminated signal are digitised, enabling slewing corrections to be made, and a mean hit rate of 5 MHz per PMT is supported. The electronics is housed within a cooled and insulated Faraday cage with environmental monitoring capabilities. During a pilot run in autumn 2014 KTAG met its design specification.

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Classifica Sessioni: Photo Detectors and PID - Poster Session

Classificazione della track: S2 - Photon Detector and PID