

The large-angle photon veto detector system for the NA62 experiment at CERN

The goal of the NA62 experiment is to collect about 80 $K^+ \rightarrow \pi^+ \nu \text{ anti-}\nu$ events with a S/B ratio of $\sim 10:1$. The branching ratio (BR) for this decay is $\sim 10^{-10}$ and can be predicted in the Standard Model with minimal theoretical uncertainties, making it a sensitive probe for new physics. Measurement of this BR is challenging because of the background from dominant channels. To reduce background from $K^+ \rightarrow \pi^+ \pi^0$ (BR = 21%) to an acceptable level, the π^0 must be detected with an inefficiency of less than 10^{-8} . NA62 will make use of the existing NA48 beamline and liquid-krypton calorimeter. A new photon veto system consisting of 12 rings placed along the vacuum volume is needed to detect large-angle photons (7 to 50 mrad) with an inefficiency of less than 10^{-4} over the energy interval from a few hundred MeV to 35 GeV). A comprehensive R&D program was carried out in 2007-2008 to compare different detector technologies, including the reuse of lead-glass blocks from the OPAL barrel calorimeter, ultimately demonstrating the feasibility of this approach. In 2009, a complete prototype of one ring was constructed, complete with front-end electronics to measure energies via time over threshold with a dynamic range of 1000, and an in-situ calibration and monitoring system. The prototype was successfully tested with electron and muon beams at the CERN SPS in fall 2009. We will review the status of the project and present preliminary results from the recent tests.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

http://www.pi.infn.it/~fantechi/VCI10_NA62_veto_summary.pdf

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