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

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The branching ratio (BR) for the decay K\^+ \to \pi\^+\nu\bar{\nu} is a sensitive probe for new physics. The NA62 experiment at the CERN SPS will measure this BR to within about 10%. To reject the dominant background from channels with final state photons, the large-angle vetoes (LAVs) must detect photons with energies as low as 200 MeV with an inefficiency of less than 10\^{-4}, as well as provide energy and time measurements with resolutions of \sim 10% and 1 ns for 1 GeV photons. The LAV detectors make creative reuse of lead-glass blocks recycled from the OPAL electromagnetic calorimeter barrel. We describe the mechanical design and challenges faced during construction, the development of front-end electronics to allow simultaneous time and energy measurements over an extended dynamic range using the time-over threshold technique, and the development of an in-situ calibration and monitoring system. Our results are based on test beam data collected using prototypes of the LAV detectors.

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