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The Kaon identification detector for the NA62 rare Kaon decay experiment at CERN

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The NA62 experiment at the CERN SPS aims to collect about 100 events of the ultra rare Kaon decay $K^+ \rightarrow \pi^+ \nu\bar{\nu}$, with a Signal to Background (S/B) ratio of 10:1. The main purpose is the measurement of the Branching Ratio of the decay with a 10% accuracy. NA62 will use an unseparated charged beam with Kaon decays in flight technique. Pions and protons cannot be separated efficiently from Kaons at the beam level. To make a positive identification of the $\sim 6\%$ of Kaons in the high rate environment (~ 800 MHz) before they decay a Hydrogen gas-filled differential Cherenkov counter (CEDAR) is placed in the incoming beam. The counter will be insensitive to pions and protons and it will give precise timing to reconstruct the $K^+ \rightarrow \pi^+ \nu\bar{\nu}$ decay. The CEDAR detector is required to achieve a Kaon tagging efficiency of at least 95% with a time resolution of at least 100 ps.

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