## TIPP 2011 - 2nd International Conference on Technology and Instrumentation in Particle Physics



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## THE NA62 RICH DETECTOR

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The CERN NA62 experiment aims to measure the ultra-rare charged kaon decay K+ -> pi+ nu nubar(branching fraction O(10-10)) with a 10% accuracy. The detector must be able to reject background events from decay channels which branching fractions are up to 10 order of magnitude higher than the signal and with similar experimental signature. To suppress the main background from K+ -> mu+ nu decay (BR  $\sim$  63%), NA62 will rely on a gas based RICH detector for pion/muon separation in a momentum range between 15 and 35 GeV/c with a muon rejection factor better than 5x10-3. The RICH detector will be used as Level 0(LO) trigger and event time measurement with a resolution better than 100ps to minimize wrong matching with the mother particle measured by an upstream detector.

To provide such a very demanding task a RICH detector filled with Neon at atmospheric pressure, 18 m long and equipped with 2000 photomultipliers has been proposed. The details of the RICH project will be described. A RICH prototype of the same length of the final detector, equipped with 96 PMs has been built and tested on a pion beam at CERN in the 2007 fall. A second prototype of a full length Neon filled vessel equipped with a spherical mirror and 414 PMs in the focal plane was built and tested in 2009 at CERN SPS on a positive hadron beam. The results of the two test beams will be presented: the muon misidentification probability is found to be about 0.7% and the time resolution better than 100 ps in the whole momentum range. Preliminary results on test beam data and Montecarlo comparison for runs collected with CO2 and Oxygen polluted Neon will be also presented.

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