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A detector for the measurement of the ultrarare decay K+->pi+ nu nubar: NA62 at the CERN SPS

vendredi 22 juillet 2011 12:00 (15 minutes)

The NA62 experiment at CERN aims at the very challenging task of measuring with 10% relative error the Branching Ratio of the ultrarare decay of the K+ into pi+ neutrino and antineutrino, which is expected to occur only in about 8 out of 10^11 kaon decays. This will be achieved by means of an intense hadron beam, an accurate kinematical reconstruction and a redundant veto system for identifying and suppressing all spurious events. The good resolution on the missing mass in the decay is achieved using a performant beam tracker (Gigatracker) to measure the kaon momentum and with a spectrometer equipped with straw tubes operating in vacuum. Hermetic veto (up to 50 mrad) of the photon from pi0 decays is achieved with a combination of large angle veto (with a creative reuse of the old OPAL lead glass blocks), the NA48 LKr calorimeter and two small angle calorimeters to cover the angle down to zero. The identification of the muons and the consequent veto is performed by a fast hodoscope plane (used in the first level of the trigger to reduce the rate) and by a 18-meter, neon-filled RICH counter which is able to separate pions and muons in the momentum interval between 15 and 35 GeV. Particle identification in the beam (kaon-pion separation) is achieved with an hydrogen differential Cherenkov counter (CEDAR).
The trigger for the experiment is based on a multilevel structure with a first level implemented in the readout boards and with the subsequent level done in software. The aim is to reduce the 10 MHz L0 rate to few KHz sent to the CERN computing center. Studies are underway to use GPU boards in some key point of the trigger system to improve the performance.
The talk will review the layout of the detector and give an update on the construction status and prospects.

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Classification de Session: Detector R & D and Data Handling

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