

Recent results from NA48 and NA62

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Abstract content

High precision measurement of the form factors of the semileptonic decays $K^{+-} \rightarrow \pi^0 l^{+-} \nu$ (K13)
 ===== Semileptonic kaon decays offer the most precise determination of the CKM matrix element $|V_{us}|$. The experimental precision is however limited by the knowledge of the form factors of this decay, since these enter both the phase space integral and the detector acceptances. The NA48/2 experiment presents new measurements of the form factors of the semileptonic decays of charged kaons, based on 4.3 million Ke_3 and 3.5 million $K\mu_3$ decays, both with negligible background. The result matches the precision of the current world average on the vector and scalar form factors and allows to significantly reduce the form factor uncertainty on $|V_{us}|$. In addition, the comparison of both channels sets tight constraints on lepton flavor violation and other possible new physics.

Rare kaon decay measurements with NA62 minimum bias data.

The NA62 experiment at CERN collected a large sample of charged kaon decays with a low intensity beam and minimum bias trigger conditions in 2007. This allowed measurements of a number of rare decays that are difficult to address in conventional high intensity experiments with highly selective trigger conditions. In particular, large samples of $K^{+-} \rightarrow \pi \gamma \gamma$ and $K^{+-} \rightarrow e \nu \gamma \gamma$ decays have been collected, allowing precision tests of the Chiral Perturbation Theory. The status and first results of these analyses are presented.

Lepton Universality Tests in Kaon Decays at NA62

A precision measurement of the helicity-suppressed ratio R_K of the $K^{+-} \rightarrow e^{+-} \nu$ and $K^{+-} \rightarrow \mu^{+-} \nu$ decay rates has been performed using the full data set collected by the NA62 experiment in 2007–2008. The result is in agreement with the Standard Model expectation, and constrains two-Higgs-doublets extension of the Standard Model.

The NA62 experiment at CERN

The rare decays $K \rightarrow p n \pi$ are excellent processes to make tests of new physics at the highest scale complementary to LHC thanks to their theoretical cleanliness. The NA62 experiment at CERN SPS aims to collect of the order of 100 $K^{+-} \rightarrow p n \pi$ events in two years of data taking, keeping the background at the level of 10%. The physics prospects and the status of the construction of the experiment will be presented.

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