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QCD tests at NA48

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The NA48/2 experiment was originally constructed to measure CP violation in charged kaon sector, using simultaneous positive and negative kaon beams. Several charged kaon decay modes have been collected during two years of data taking. The kaon system is a unique laboratory in which study the dynamics of the QCD in low energy regime, with high statistics and precision. The pi-pi scattering close the threshold has been studied with unprecedented statistics, using more than one million K+- –> Pi+ Pi- e+- nu (Ke4) and the cusp structure in more than 60 million K+- –> pi+- pi0 pi0.
The S-wave scattering lengths a0 and a2 have been measured independently in these two modes allowing accurate tests of Chiral Perturbation Theory.
We also report on the measurement of the branching fraction of the decay K+- -> pi+- gamma gamma using more than 1000 reconstructed decays from the 2003 NA48/2 data set. The data statistics are about a factor of 30 larger than for any previous measurement. The spectrum of invariant gamma gamma mass shows the expected behaviour, being compatible with a decay parameter cˆ of the order of 2.
In addition we report on the first measurement of the related decay K+- -> pi+- e+ e- gamma (with internal gamma conversion) branching fraction and the decay distribution, using 120 reconstructed K+- -> pi+- e+ e- gamma events from the complete NA48/2 data set.
Both measurements are in good agreement with the theoretical expectations from Chiral Perturbation Theory.

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