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Recent NA48 results on QCD and ChiPT

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The NA48/2 experiment at CERN collected a very large sample of charged kaon decays into multiple final states.
This data allow measurements related to QCD and Chiral Perturbation Theory, and the an updated measurement of |VUS|.
In particular, we collected about 1500 events of the very rare decay K+- —>mu+- nu e+ e- over almost negligible background in the region with m(e+e-) above 140 MeV, which is of great interest in Chiral Perturbation Theory, thanks to the m_ee spectrum and a model-independent measurement of the decay rate for this region.
Also we performed the first observation of the rare decay K+ to pi+pi0e+e-, with about 5000 candidates and 5% background contamination, and the preliminary branching ratio in the full kinematic region is measured to be (4.22 ± 0.15) × 10ˆ−6, in perfect agreement with theoretical predictions based on Chiral Perturbation Theory.
Finally, we obtained our final measurement of the charged kaon semileptonic decays form factors based on 4.28 million K±e3 and 2.91 million K±μ3 selected decays, with the smallest uncertainty for K±e3 and a competitive result for Kmu3 and leading to the most precise combined K±l3 result that reduces the form factor uncertainty of |VUS|.

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