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Model independent measurement of the leptonic kaon decay K+- ->mu+- nu e+ e- and study of the K+ ⟶ π+π0e+e− decay by the NA48/2 experiment at CERN

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The NA48/2 experiment at CERN collected a very large sample of charged kaon decays into multiple final states. From this data sample we have reconstructed 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. We present the m_ee spectrum and a model-independent measurement of the decay rate for this region.

The first observation of about 5000 candidates, with a 5% background contamination, of this rare decay is reported by the NA48/2 experiment at CERN. From the analysis of 1.7 × 10ˆ11 kaon decays collected in 2003–2004, the preliminary branching ratio in the full kinematic region is measured to be (4.22 ± 0.15) × 10ˆ−6. The observed value is in perfect agreement with theoretical predictions based on Chiral Perturbation Theory.

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