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Tests of Chiral Perturbation Theory with Ke4 decays at CERN NA48/2 experiment

The NA48/2 collaboration has accumulated more than one million charged kaon decays to $\pi^+\pi^-e^\pm\nu$ (K_{e4}^{+-}) leading to an improved determination of the branching ratio by a factor of 3 and detailed form factors and $\pi\pi$ scattering studies. Concurrently, about 60000 charged kaon decays to $\pi^0\pi^0e^\pm\nu$ (K_{e4}^{00}) have been analyzed, increasing the world available statistics by several orders of magnitude. Background contamination at percent level and very good π^0 reconstruction allow the first accurate measurements of the branching ratio and decay form factor. The achieved precision makes possible the observation of subtle effects such as $\pi^+\pi^-$ to $\pi^0\pi^0$ charge exchange scattering below the $2m_{\pi^+}$ threshold. Decay properties of both Ke4 modes bring new precise inputs to Low Energy QCD studies and can provide stringent tests of Chiral Perturbation Theory predictions.

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