

Precision study of K^{+-} into $\pi^{+-} \pi^0 \pi^0$ and K^{+-} into $\pi^{+-} \pi^+ \pi^-$ Dalitz plot distributions by NA48/2.

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The NA48/2 experiment at the CERN SPS has collected an unprecedented sample of 3-pion decays of charged kaons. The high statistics and the good resolution of the detectors allow a unique investigation of the detailed phase space distributions of these decays. The effects of final state pion rescattering observed in the Dalitz plot distribution of the K^{+-} into $\pi^{+-} \pi^0 \pi^0$ decays turned out to be a powerful tool for extraction of the S-wave pion-pion scattering lengths. The recent results obtained using a number of different theoretical approaches will be discussed, together with future prospects. The large statistics also allowed a precise measurement of the Dalitz plot slope parameters for the K^{+-} into $\pi^{+-} \pi^+ \pi^-$ decays, which will be discussed.

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