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Precision Measurement of $\pi\pi$ Scattering Lengths in K_{e4} Decays at NA48

The measurement of the S-wave $\pi\pi$ scattering lengths is a fundamental test of the validity of Chiral Perturbation Theory. We report on the final NA48/2 result, which uses the complete NA48/2 data set with more than a million reconstructed K_{e4} decays. From these events we have determined the decay form factors and $\pi\pi$ scattering lengths $a_{0,0}$ and $a_{2,0}$. The result is the most precise measurement of the scattering lengths and in excellent agreement with the prediction of Chiral Perturbation Theory.

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