High Energy Physics - Experiment

Precision Meson Spectroscopy at COMPASS

Boris Grube, for the COMPASS Collaboration

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We present first results of a partial wave analysis of the diffractive reaction $\pi- Pb \to \pi- \pi+ \pi- Pb$ based on data from the COMPASS experiment taken during a pilot run in 2004 using a 190 GeV/c $\pi-$ beam on a lead target. The analysis was performed in the region of squared four-momentum transfer t' between 0.1 and 1.0 (GeV/c)^2. The $\pi- \pi+ \pi-$ final state shows a rich spectrum of well-known resonances. In addition a spin-exotic $J^{PC} = 1^{-+}$ state with significant intensity was observed at 1.66 GeV/c^2 in the $\rho(770) \pi$ decay channel in natural parity exchange. The resonant nature of this state is manifest in the mass dependence of its phase difference to $J^{PC} = 1^{++}$ and 2^{-+} waves. The measured resonance parameters are consistent with the disputed $\pi_1(1600)$. An outlook on the analyses of the much larger data set taken during 2008 and 2009 is given.

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