

The COMPASS hadron program

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Collaboration

COMPASS

Abstract content

COMPASS is a multi-purpose fixed-target experiment at the CERN Super Proton Synchrotron aimed at studying the structure and spectrum of hadrons. One main goal is the search for new hadronic states, in particular hybrid mesons and glueballs. Its large acceptance, high resolution, and high-rate capability make the COMPASS experiment an excellent device to study the spectrum of light-quark mesons in diffractive and central production up to masses of about $2.5 \text{ GeV}/c^2$. COMPASS is able to measure final states with charged as well as neutral particles, so that resonances can be studied in different reactions and decay channels. During 2008 and 2009, COMPASS took a large data sample using 190 GeV negative and positive hadron beams on various targets. We present new results from the analyses of this data set. One focus lies on the search for new mesons in diffractively produced multi-particle final states. Here novel analysis methods are applied to study the dependence of partial waves on the squared four-momentum transfer t' from the beam to the target. This also leads to a better separation of resonant and non-resonant contributions. In addition a new analysis scheme was developed that permits to extract information about the $\pi^+\pi^-$ subsystem in the $\pi^-\pi^+\pi^-$ final state with only minimal model bias. In addition central-production reactions are studied in order to search for glueball candidates in the scalar sector. Finally an update will be given on the recent analysis of the pion polarizability, well suited to test chiral dynamics.

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