Contribution ID: **212** Type: **Talk**

Recent Results on Light-Meson Spectroscopy from COMPASS

Wednesday, 27 September 2017 09:00 (25 minutes)

COMPASS is a multi-purpose fixed-target experiment at CERN aimed at studying the structure and spectrum of hadrons. The two-stage spectrometer has a good acceptance over a wide kinematic range and is thus able to measure a wide range of reactions. Light mesons are studied with a negative hadron beam (mostly π^-) with a momentum of 190 GeV/c. The light-meson spectrum is investigated in various final states produced in diffractive dissociation. The flagship channel is the $\pi^-\pi^+\pi^-$ final state, for which COMPASS has acquired the so far world's largest dataset of 46 M exclusive events. We report on new results for this final state, which allows us to investigate a_J and π_J mesons, employing partial-wave analysis (PWA). In this method, the decay into $\pi^-\pi^+\pi^-$ is modeled as subsequent two-body decays in order to disentangle the contributions of different partial waves. The large size of our dataset allows to perform this analysis in narrow bins of the squared four-momentum transfer t'. Thus, we can also extract the t' dependence of the various components from the data. Finally, the resonance parameters of a_J and π_J mesons are measured by disentangling resonant and non-resonant parts of 14 selected partial waves simultaneously in a resonance-model fit. Combining 14 partial waves in a single resonance-model fit allows us to study also weaker signals, e.g. from excited a_1, a_2, or π_2 states, by making use of their interference pattern and their different couplings to the various decay modes.

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Session Classification: Spectroscopy of mesons

Track Classification: Spectroscopy of mesons