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Pion induced reaction with carbon and polyethylene targets obtained by HADES-GSI in 2014

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In the summer of 2014, HADES conducted measurements with secondary pion-beam using different targets. The program is devoted to measure dielepton radiation from baryonic resonances. In particular we investigated a sub-threshold coupling of rho to baryonic resonances in the second resonance region, specially N(1520). Most of the beam time was dedicated to measurement of e^+e^- production from PolyEthylene target at pion beam momentum of 690 MeV/c. Combining these data with carbon data it is possible to extract pion-proton interactions. Therefore it was possible to measure at the same time exclusive $\pi^- p \to e^+e^-$ and inclusive e^+e^- production. The normalization of spectra has been done using elastic scattering of pion on proton. The identification of e^+e^- is was performed through appropriate cuts on time-of-flight, energy loss, shower signal and RICH (Ring Imaging Cherenkov) observables. Exclusive and inclusive invariant mass spectra is compared with the different channel contributions simulated with a dedicated Monte Carlo simulation tool for hadronic physics (PLUTO). Using missing mass cuts it was possible to identified the events from the reaction $\pi^- p \to n e^+e^-$ which shows that the e^+e^- yield of invariant mass above 250 MeV/c^2 is consisted with $N(1520) \to n\rho \to n e^+e^-$. Models associate the excess of dilepton measured in heavy ions reactions with the excitation and decay of baryonic resonances of dileptons via intermediate ρ meson

Content type

Experiment

Collaboration

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Author: RODRÍGUEZ-RAMOS, Pablo (Nuclear Physics Institute ASCR)

Presenter: RODRÍGUEZ-RAMOS, Pablo (Nuclear Physics Institute ASCR)

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