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Study of baryonic resonances in the reaction $pp \rightarrow pp\pi^+\pi^-$ at 3.5 GeV with HADES

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Pion production in NN collisions is one of the sources of information on the NN interaction and on the contribution of nucleon resonances. In particular, two-pion production in the few energy range, carries information both on single and double baryon excitation and on $\pi\pi$ dynamics, which are also useful for the interpretation of dielectron production. Baryonic resonances indeed contribute to the dielectron spectra via their Dalitz decay $(R \to Ne^+e^-)$ and indirectly as intermediate states for neutral meson Dalitz decays. In addition, the $\pi^+\pi^-$ production channel gives access to the ρ contribution, which, due to its coupling to the baryonic resonances, is a crucial ingredient of calculations of the e^+e^- emissivity in hadronic matter. The possibility to measure simultaneously with HADES pion and e^+e^- production is therefore a great advantage. Recently, differential and integrated cross sections for the reactions $pp \to pp\pi^0$, $pp \to pn\pi^+$ [1], [2],

 $pp \rightarrow pp\pi^+\pi^-$, $pn \rightarrow pn\pi^+\pi^-$ [3], $pn \rightarrow d\pi^+\pi^-$ [4] have been investigated with HADES at kinetic energies 1.25, 2.2 and 3.5 GeV. We focus here on the analysis of the $pp \rightarrow pp\pi^+\pi^-$ channel at 3.5 GeV, using results from $pp \rightarrow pp\pi^0$, $pp \rightarrow pn\pi^+$ and $pp \rightarrow pK\Lambda$ [3] measured at the same energy by HADES.

[1] G. Agakishiev et al., Eur. Phys. J. A41, 243-277 (2009).

[2] G. Agakishiev et al. Eur.Phys.J. A48 (2012) 74.

[3] G. Agakishiev et al. Eur.Phys.J. A50 (2014) 82.

[4] G. Agakishiev et al. , Eur.Phys.J. A51 (2015), 137.

[5] G. Agakishiev et al., Phys.Lett. B750 (2015) 184.

[6] G. Agakishiev et al. Phys.Lett. B742 (2015) 242-248.

Auteur principal: Mme BELOUNNAS, Amel (PHEN)

Orateur: Mme BELOUNNAS, Amel (PHEN)

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