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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 ( $R \rightarrow Ne^+e^-$ ) and indirectly as intermediate states for neutral meson Dalitz decays. In addition, the  $\pi^+\pi^-$  production channel gives access to the  $\rho$  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  $pp \rightarrow pp\pi^0$ ,  $pp \rightarrow pn\pi^+$  [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.

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