## The $\Lambda(1405)$ in pp collisions at 3.5 GeV

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Although the  $\Lambda(1405)$  resonance is known for several years, its structure is still a topic of ongoing investigation. In the past, several experiments have been carried out to investigate this resonance, but most results were hampered by low resolution and limited statistics. A detailed study of the line shape of this resonance however, requires a variety of measured reactions with high statistic, as the line shape of the  $\Lambda(1405)$  turns out to be not compatible with any standard form of resonances. Theory has therefore developed various interpretations, concerning the nature of the  $\Lambda(1405)$ . The state of the art is to treat this resonance in a coupled channels approach, describing it as a molecular state of a meson and a baryon. In this sense the  $\Lambda(1405)$  consists partly of a  $\overline{K}$ -N quasi bound state, making this particle interesting in terms of the possible existence of kaonic clusters. To verify these complex theories, new experimental data are strongly required.

We have analyzed a p+p run at 3.5 GeV, measured with the High Acceptance Di-Electron Spectrometer (HADES). The  $\Lambda(1405)$  could be reconstructed in all its three decay channels  $\Sigma^+\pi^-$ ,  $\Sigma^-\pi^+$  and  $\Sigma^0\pi^0$ . The three different line shapes can be compared to each other in order to investigate the dependence of the line shape on the production and decay mechanism.

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