

# INCLUSIVE $\Lambda$ HYPERON PRODUCTION IN PROTON-PROTON REACTIONS AT 3.5 GEV MEASURED WITH HADES

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The total production cross-section of  $\Lambda$ -hyperons was measured with the HADES spectrometer at GSI Helmholtz Institute for Heavy Ion Research in Darmstadt in proton- proton reactions at  $\sqrt{s} = 3.18$  GeV. Experimental data were compared to a data- driven model based on measured exclusive channels for  $\Lambda$  production extracted from the same reaction.

Beside phase-space production, contributions from  $\Sigma(1385)$ ,  $\Lambda(1405)$ ,  $\Delta^{++}$  and  $N^*$  intermediate resonances has been considered. The final state with the largest cross section

( $pp \rightarrow pK^+\Lambda$ ) was analyzed in previous works by the HADES collaboration employing Partial Wave Analysis. It is shown that pure phase-space production does not describe all kinematical variables of the observed distributions and the inclusion of coherent sum of intermediate resonances is necessary. The obtained result shows the total cross-section of  $\sigma(pp \rightarrow \Lambda + X) = 201.3 \pm 1.3^{+6.0}_{-7.3} \pm 8.1^{+0.4}_{-0.4}$   $\mu\text{b}$ , additionally differential analyses provide a description of the spatial distributions of the production as a function of the polar angle and the rapidity. These results are the first measurements of the inclusive  $\Lambda$ -hyperon production in the resonance production energy regime since early measurements with the bubble chambers in the 60's and 70's.