Near Threshold Hyperon-Production at COSY-11 in the Reactions $pp \to pK^+\Lambda$ and $pp \to pK^+\Sigma^0$

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At the Cooler Synchrotron COSY in Jülich the production of strange particles has successfully been measured. At the internal COSY-11 experiment [1] a hydrogen cluster target is installed in front of a regular COSY-dipole. This magnet is used as a spectrometer for the reaction products. The detection system is based on drift chambers and scintillation-counters.
Near threshold data of the $pp \to pK^+\Lambda$ reaction have recently been published by the COSY-11 [2-4] and the COSY-TOF collaboration [5]. Since before these COSY-measurements no exclusive data in the threshold region were available, the present results have given input to theoretical models describing the strangeness production in baryon-baryon collisions. Investigations of the hyperon-production above the different Σ-thresholds provides an understanding of the Σ-production processes and of the possible Λ-Σ coupling (cusp-effect).
Therefore the COSY-11 collaboration has extended its program from the Λ- to the Σ^0-production. After the presentation of the COSY-11 facility the results of the $pp \to pK^+\Sigma^0$ measurements [6] will be compared to the $pp \to pK^+\Lambda$ reaction. It was found, that the corresponding cross sections at equivalent excess energies near threshold are about a factor of 28 smaller for the Σ^0-production than for the Λ-production.

References

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