Investigation of the $pp \to nK^+\Sigma^+$ reaction

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Reactions of the type pp $\to$ NKY are presently studied at COSY, the COolerSYnchrotron of the Research Center Jülich, Germany, in very detail, in particular the channels Y = (Λ, Σ^0). Data on Σ^+, Σ^- are not known close to threshold.
A measurement of the channnel $pp \to nK^+\Sigma^+$ $(\Sigma^+ \to p\pi^0, \Sigma^+ \to n\pi^+)$ was performed with the short version of the COSY-Time-of-Flight spectrometer, which consisted of a double-layer start detector, three double-layer vertex detectors and a three-layer stop detector. The latter was mounted 1m downstream of the liquid hydrogen target. Neutrons were detected with a 10cm thick scintillator wall (COSYnus). The time-of-flight resolution limits the velocity resolution, and the selection of good events rests mainly on geometry. This, however, suffices due to the good spatial resolution of both the vertex detectors and the stop detector. The large background due to $pp \to np\pi^+$ is suppressed by various selection criteria on kinematic variables and on the time of flight of the primary neutron. The setup, the analysis methods and results will be presented. The total cross section will be discussed in comparison with results in the other hyperon channels.