

COSY Proposal and Beam Request

For Lab. use

Exp. No.:	Session No.
171.1	33

Title of Experiment

Study of the energy dependence of the $pp \rightarrow K^+ n \Sigma^+$ reaction close to threshold

Collaborators: ANKE Collaboration

Spokespersons for collaboration:

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No support from the LSF program of the EC was requested

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Total number of particles and type of beam (p,d,polarization)	Momentum range (GeV/c)	Intensity or internal reaction rate (particles per second)	
		minimum needed	maximum useful
Protons	5 beam momenta in the range 2.6-2.8	$2 \cdot 10^{10}$	
Type of target	Safety aspects (if any)	Earliest date of installation	Total beam time (2weeks)
ANKE cluster-jet target (H ₂)	-	September 2007	2 weeks

What equipment, floorspace etc. is expected from Forschungszentrum Jülich/IKP?

Summary of experiment:

It is proposed to investigate the production of positively charged Σ^+ -hyperons in proton-proton collisions at five beam energies T_p between threshold ($T_p=1.79$ GeV) and ~ 2 GeV, using the ANKE spectrometer. Information on the $pp \rightarrow K^+n\Sigma^+$ reaction channel will be obtained from three simultaneously measured observables, *viz* the K^+p , $K^+\pi^+$ correlation spectra and the K^+ inclusive double-differential cross section. The $pp \rightarrow K^+n\Sigma^+$ reaction channel will be tagged by detecting the K^+ in coincidence with the π^+ originating from the Σ^+ -decay. Due to strangeness conservation, there is no other source of such correlated pairs below the $K^+n\Lambda\pi^+$ threshold ($T_p=1.98$ GeV).

Two issues were raised by PAC#32 which are addressed in the Addendum to the Beam Request:

- 1) In Fig. 1 we include not only the result, obtained from existing ANKE data (see attached paper draft), but also the cross sections of the two measurements using the TOF detector (given in PhD theses).
- 2) In Table 1 we present results of the ANKE acceptances for three energies and different methods to be used in the analysis of the experimental data. Additional information can be found in the above mentioned paper.

We ask the PAC for the approval of the proposal and allocation of **two weeks (including 4 days for machine development)** of beam time in **Autumn 2007**.