

ANKE Beam Time November 2013

29. Oktober 2013 ANKE Beam Time Preparatory Meeting

COSY: Ralf Gebel, Bernd Lorentz, Seva Kamerdzhiev, Rudolf Maier,
Dieter Prasuhn, Rolf Stassen, Hans Stockhorst,

ANKE: Sergey Barsov, Sergey Dymov, Ralf Engels, Kirill Grigoriev,
Andro Kacharava, Max Mikirtychiants, Sergey Mikirtychiants,
Ralf Schleichert, Valery Serdyuk, Hans Ströher, Yuri Valdau,
and Colin Wilkin

ANKE Experiments 2013 / 14

Intense small size, highly polarized COSY proton beam

- Stacking injection, minimized acceleration losses
- Stochastic cooling at experiment energy
- $5 \cdot 10^9$ protons (flat-top) with $> 60\%$ polarization

High intensity, high polarization ABS beam

$> 3 \cdot 10^{16}$ $D^\circ(H^\circ)/s$, with $Q_y \sim 90\%$, $Q_{yy} \sim 90\%$

Open- and closable target cell

$> 4 \cdot 10^{13} / \text{cm}^2$ D° and H°

New Silicon Tracking Telescopes

- | | |
|---------------------------------------|----------------------|
| • Spectator proton detection | Exp. 218 |
| • Measure polarization along the cell | Exp. 213.1, 218, 219 |
| • Pion tracking | Exp. 213.1 |

ANKE #213.1: 887 MeV/c, 8.4°, B=0.55 T

Preparatory experiment for measurement of $A_{x,z}$ in $pn \rightarrow \{pp\}_s \pi^-$ process.

Aims of the experiment:

- background conditions with an openable cell
- cell size optimisation
- π^- detection in the new STT
- D^0 polarisation in the cell

Request for COSY:

- electron cooling at injection
- stacking up to $\geq 10^{10}$ protons at flattop
- minimal beam size at flattop, equal in X and Y
- low emittance growth without target

ANKE 219: 2425 MeV/c, 8.4°, B=1.57 T

- High polarisation (>80%) and intensity (> 5×10^9) of polarised beam at injection
- E-cooling at the injection energy
- Stacking at injection
- Acceleration to 2.425 GeV/c without significant loss of polarisation (~80%) and beam intensity (> 10^{10})
- Transverse and longitudinal stochastic cooling against ANKE target at the flat top energy
- Put the beam through the ~10 mm openable storage cell at 2.425 GeV/c

Our goals:

- To select optimal storage cell diameter for the production run
- To study polarisation change along the target cell
- Test K^+ identification with ANKE and storage cell
- Study the background conditions in K^+p missing mass spectra

ANKE Beam Time:

- KW45-46:** Machine Development
- KW47:** Cell Commissioning
- KW48:** Study background at 887 MeV/c (353 MeV)
- KW49:** Study background at 2425 MeV/c (1677 MeV)
- KW50:** Deinstallation of Storage cell and STT

ANKE Beam Time: Machine Development

KW45-46 Machine Development (unpolarized proton beam):

- ANKE@0°: e-cooled beam with $> 10^{10}$ protons at injection
- ANKE@0°: 887 MeV/c and 2425 MeV/c
- ANKE@8.4°, LA1=?, LA2=? (for ABS bridge!)
- 0.56 T, 887 MeV/c:
 - beam profile measurement / optimization
- ANKE@8.4°, 1.57 T, 2425 MeV/c:
 - Stochastic cooling
 - beam profile measurement / optimization
- ABS / Lambshift optimization with D°
- ABS / Lambshift optimization with H°

ANKE Beam Time:

KW45-46 Machine Development

KW47 Cell Commissioning:

- 2-days installation of storage cell and one (old) STT
- ANKE@8,4°, 887 MeV/c:
 - Beam optimization with D° target.
 - beam profile and Schottky measurement with D° target.
- ANKE@8.4°, 2425 MeV/c, stochastic cooling
 - beam profile and Schottky measurement with H° target:

KW48: Study (physical) background at 2425 MeV/c

KW49: Install one new STT,
Study (physical) background at 887 MeV/c

KW50: Deinstallation of Storage cell and STT