Beam Time Preparation for Exp. 211.1

main Reaction: $p\,d \rightarrow d\,\eta\,p_{sp}$

Goals:

- Unpolarized proton beam
- Intensity as high as possible (≥2 * 10^10 protons)

D2Angle [deg]	D2 Field [T]	Energy [GeV]	Momentum [GeV/c]
8.9	1.41	1.35	2.09
8.9	1.53	1.5	2.25

- Deuterium cluster target 4-6 * 10^14 atoms/cm²
- Measurement of target position /size after beam time

- no Schottky measurements
- no beam cooling

- With barrier bucket or HF
- Flattop (cycle length) duration - to be decided
- Supercycles

Time Plan: - 25.02.2013: change source to unpolarized source
- 26./27.02.2013: beam development
- 28./29.02.2013: installation of STTs
- start of data taking after installation until 18.03.2013

beam: p_1 = 2.09GeV/c, T_1 = 1.35GeV, Q_0=40MeV
p_2 = 2.25GeV/c, T_2 = 1.5GeV, Q_0=95MeV -> same cycle length

STT: - placed at both sides of the target
- best working STT to be placed on the left side (positive x-coordinate)
- position of the center relative to the nominal target position z=-22.5mm
- angular range: theta_spec = 75° … 140°

=> one could exclude part of STT to reduce count rate caused by pd-elastic

=> Q=0...40MeV, Q=0...110MeV Delta Q =4.5MeV
=> Q=0...30MeV, Q=0...85MeV (if part of STT excluded)
=> Influence of N*(1535) should be visible in this region
=> Overlap of the energies allows test of spectator treatment

Normalization: - pd elastic scattering (=>constraints to position of STT)
- Schottky not possible (eta-Factor too close to zero)
- 900 events/s
- another method: normalization runs with pd-elastic and another reaction (e.g. pi0)
+runs with part of STT excluded, that is hit by deuterons, and calculation of luminosity with rate of second reaction

Fd-System: - identification of deuterons challenging
- use of Cerenkov-detectors not possible (not used since 2008)
- Ce-Det not effective in this energy region
- adjustment of energy losses with measurement of pi+ in Pd and identification of deuterons via ToF (~1 night)

Pd-System: - used for measuring He3 in the reaction $pd \rightarrow He^3 \omega/\eta$ (He^3 in SW1)
- needed for identification of Pions from $pd \rightarrow d \pi^+ n_{sp}$ (π^+ in Telescopes)
- wire chambers, start counters, Telescopes and SW1 needed

Nd-System: not needed for main reaction, but helpful for other interesting reactions
-> not used in main trigger, but maybe in DAQ (depending on dead time and count rate)

Trigger: 1) Fd AND STT (main reaction and pd elastic) (hit in both hodoscope layers of Fd and in first two layers of STT demanded)
2) Pd (SW1) OR Fd with He3-trigger (higher acceptance for He3 w and He3 eta)
3) Delayed Veto (in Pd) for Kaon-Production (Y. Valdau)
4a) FdOR (efficiency, <2days)
4b) STTOR (efficiency, <2days)
4c) Fd AND Pd(Tel) (energy loss calibration in Fd, ~ 1night)

Vertex-Position and Size: - Can be determined via STT-Tracks
- position/size measurement after the beam time will be done using target diagnostic devices (1-2 h)

Background: - mainly multi-Pion-events
- challenging, because eta-peak close to the kinematical limit near threshold
- use of shifted spectra at second energy, so that kinematical limits are at the same position
- after subtraction of missing mass spectra the eta peaks should be separated by a plateau of ca. 15 MeV width

Spectra to be looked at during beam time: - STT energy spectra
- STT track projections (Target position)
- Missing Mass d eta (if deuteron identification possible)
- Fd: Energy Loss
- Luminosity
- Missing Mass He3 omega/eta
- ToF (pi+ in Pd and another particle in Fd)

VIPs in Juelich: S. Dymov (Fd Calibration)
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