ω-Production on a Neutron Target at ANKE

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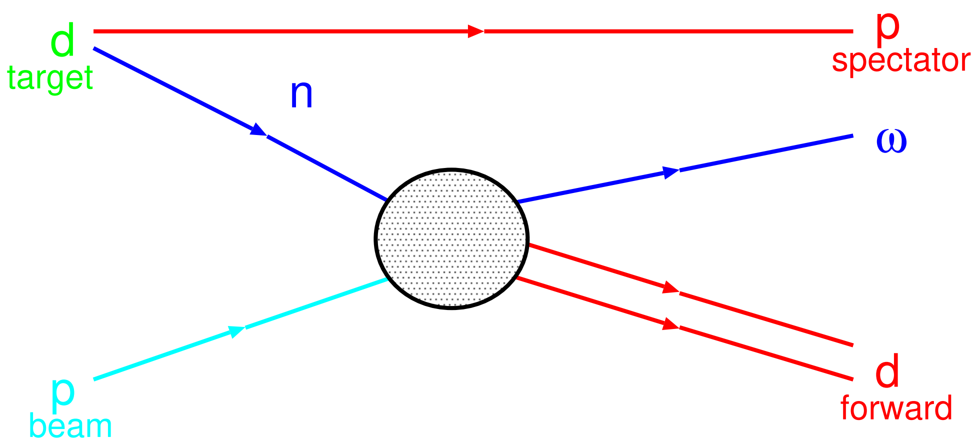
Detection Principle

$\boxed{\text{pn} \to \text{d}\omega \quad \text{in} \quad \text{pd} \to \text{p}_{\text{sp}}\text{d}\omega}$

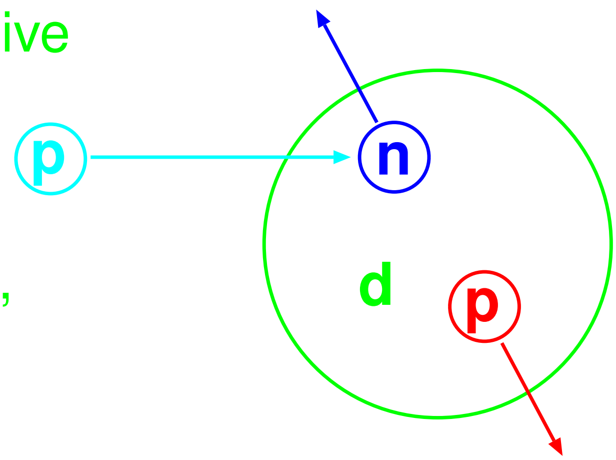


$\boxed{\text{determine } \sigma \text{ and } \frac{d\sigma}{dQ}\text{, Q-range: 0 – 100 MeV}}$

- Detect the spectator proton

  Reactions on an effective neutron target
  pn $\to$ X

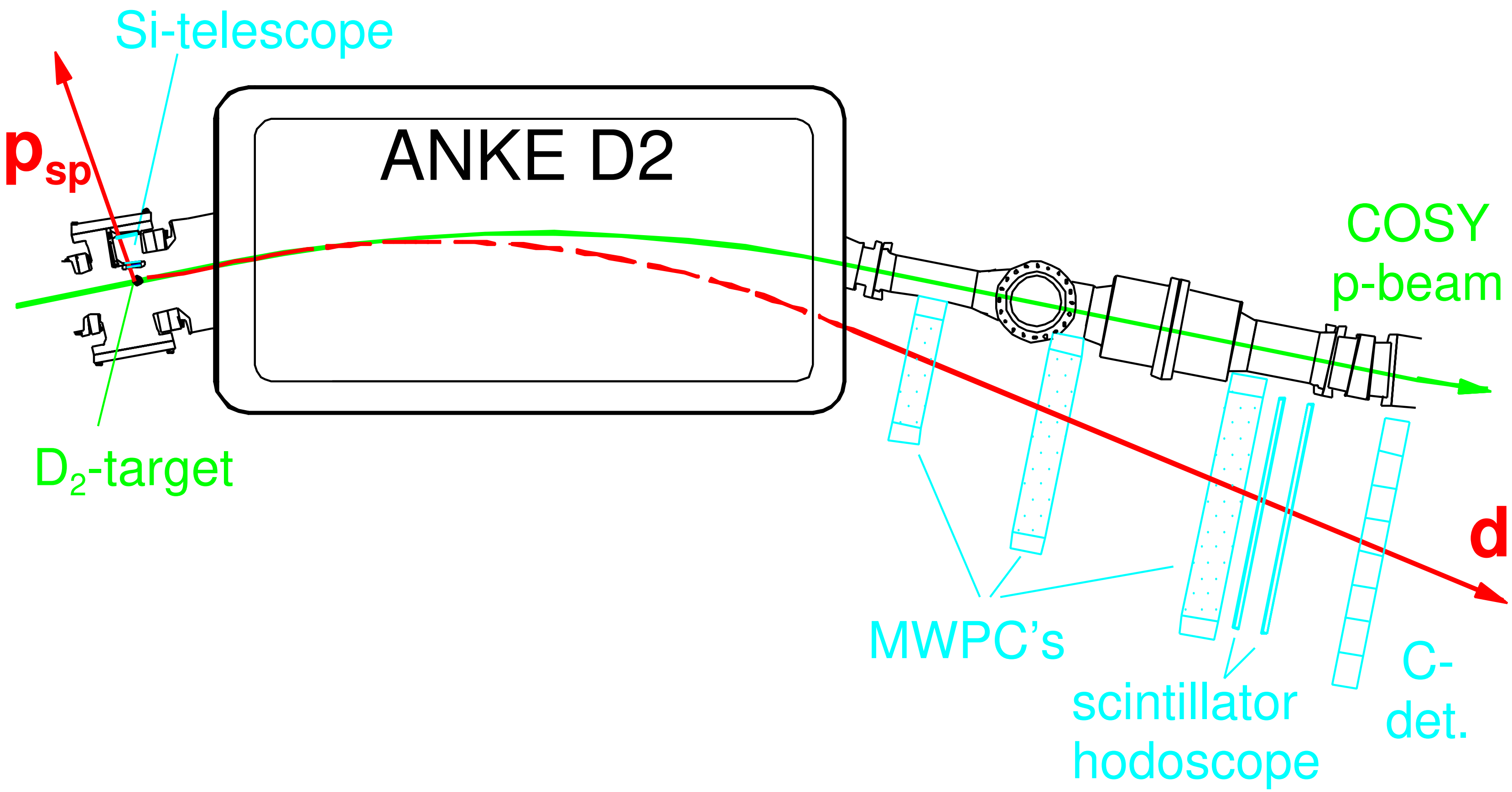
  Fixed kinematics in pn,
  i.e. $\sqrt{s}$-value
  $\Rightarrow$ Q-value of pn $\to$ dω



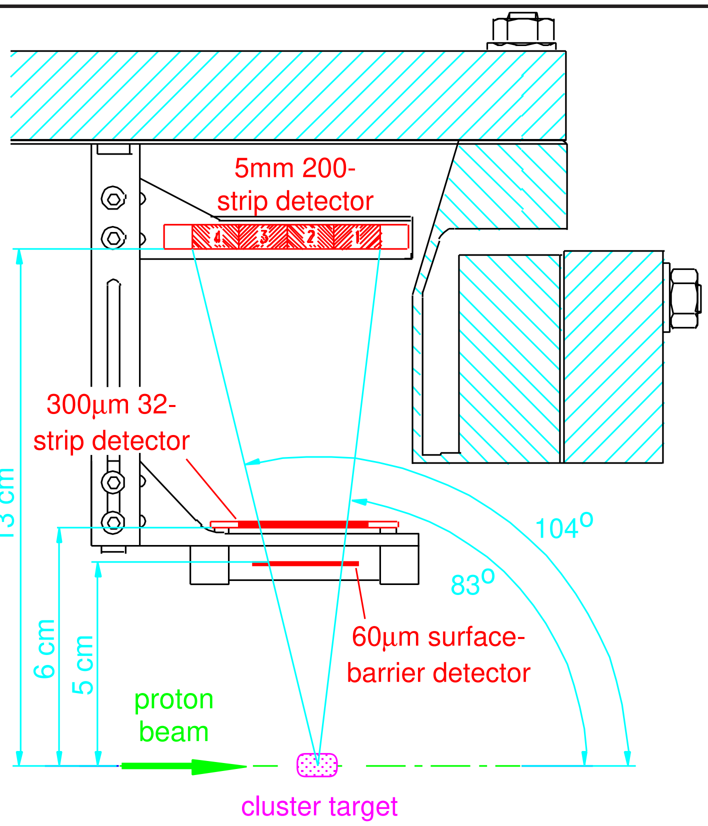
- Detect the high momentum deuteron (≈ 2 GeV/c)

  Identify the ω-meson by missing mass

Meson Production on the Neutron at ANKE

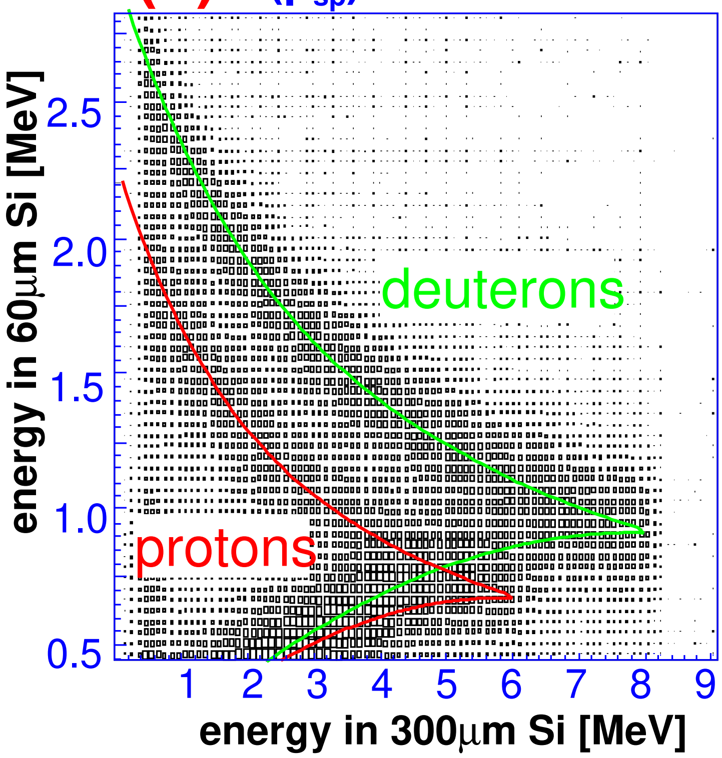


Identification of Spectator Protons

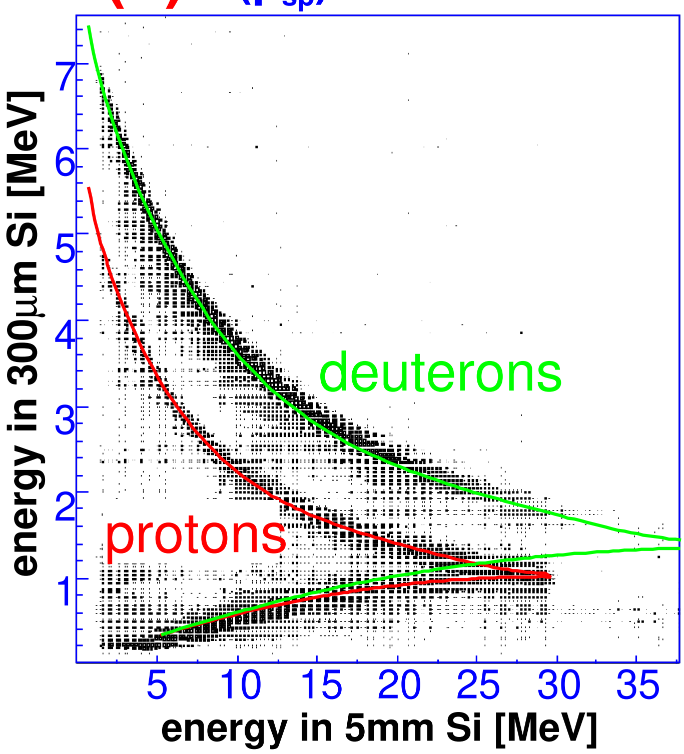


ΔE/E-particle identification in 2 energy ranges <=> 2 Q-ranges:

(1) $T(p_{sp})$ = 2.6 - 4.4 MeV

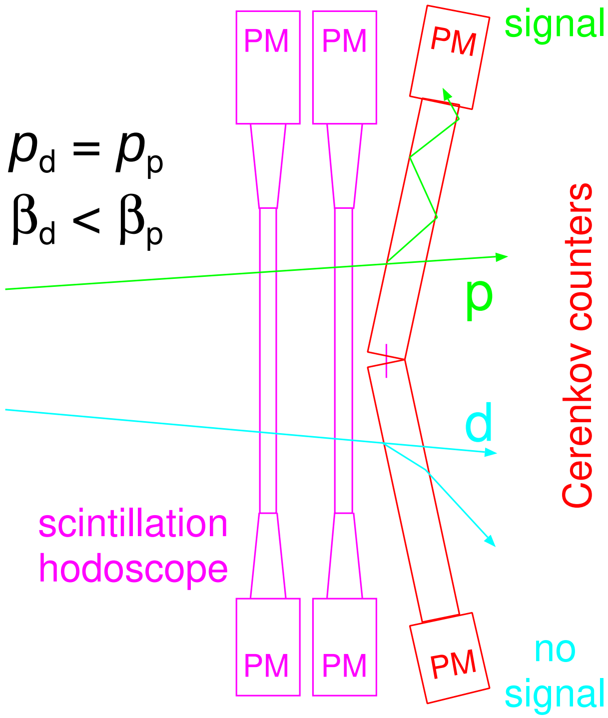


(2) $T(p_{sp})$ = 8 - 22 MeV

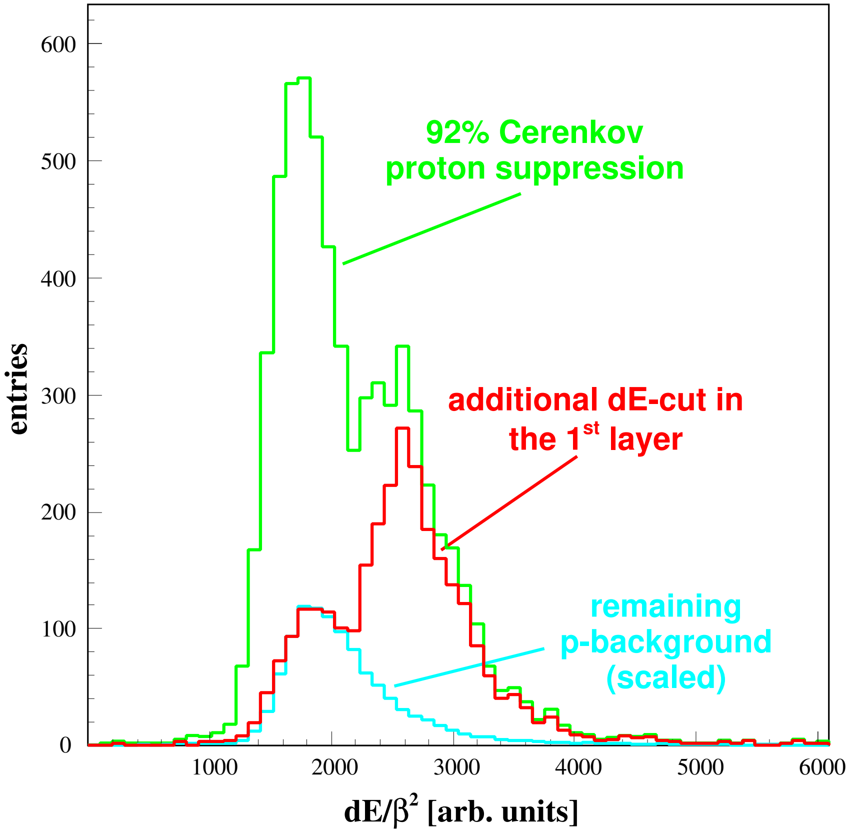


Identification of 2 GeV/c Deuterons

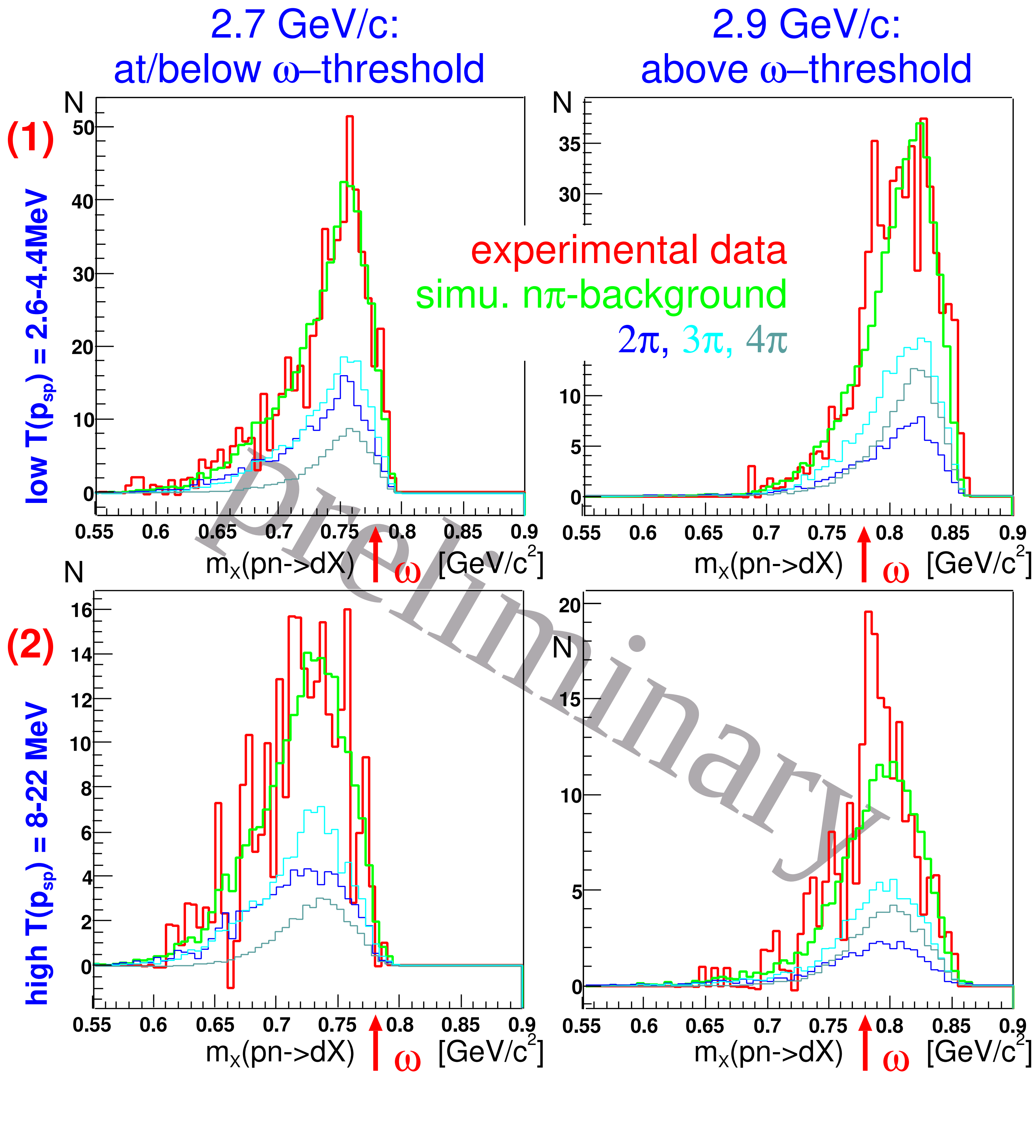
forward setup (partially)



energy loss in the hodoscope



Missing Mass in pn $\rightarrow$ dX



Outlook

- Integral cross sections will be extrapolated now.

- Q-dependence studies require larger statistics.

  A new setup with double sided silicon-strip detectors is currently under commissioning.

- Measurements of the Q-dependence (0 – 100 MeV) at a single beam energy,
  - due to improved missing-mass resolution by higher angular resolution in the silicon telescope(s),
  - and due to larger acceptance.

- Identification of deuterons explicitly using TOF (new electronics for silicon detectors, timing $\leq$ 1 ns FWHM).

  A large new target chamber at ANKE is scheduled for installation in Dec. 2002.

- Normalisation can be improved strongly.