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September 2012

THE DIFFERENTIAL CROSS-SECTION ON DP-ELASTIC SCATTERING AT 880 MEV OBTAINED AT NUCLOTRON

DSS project

- The purpose of DSS (Deuteron Spin Structure) project is broadening of energy and angular ranges of measurement of differ ems. The n n of inform s.
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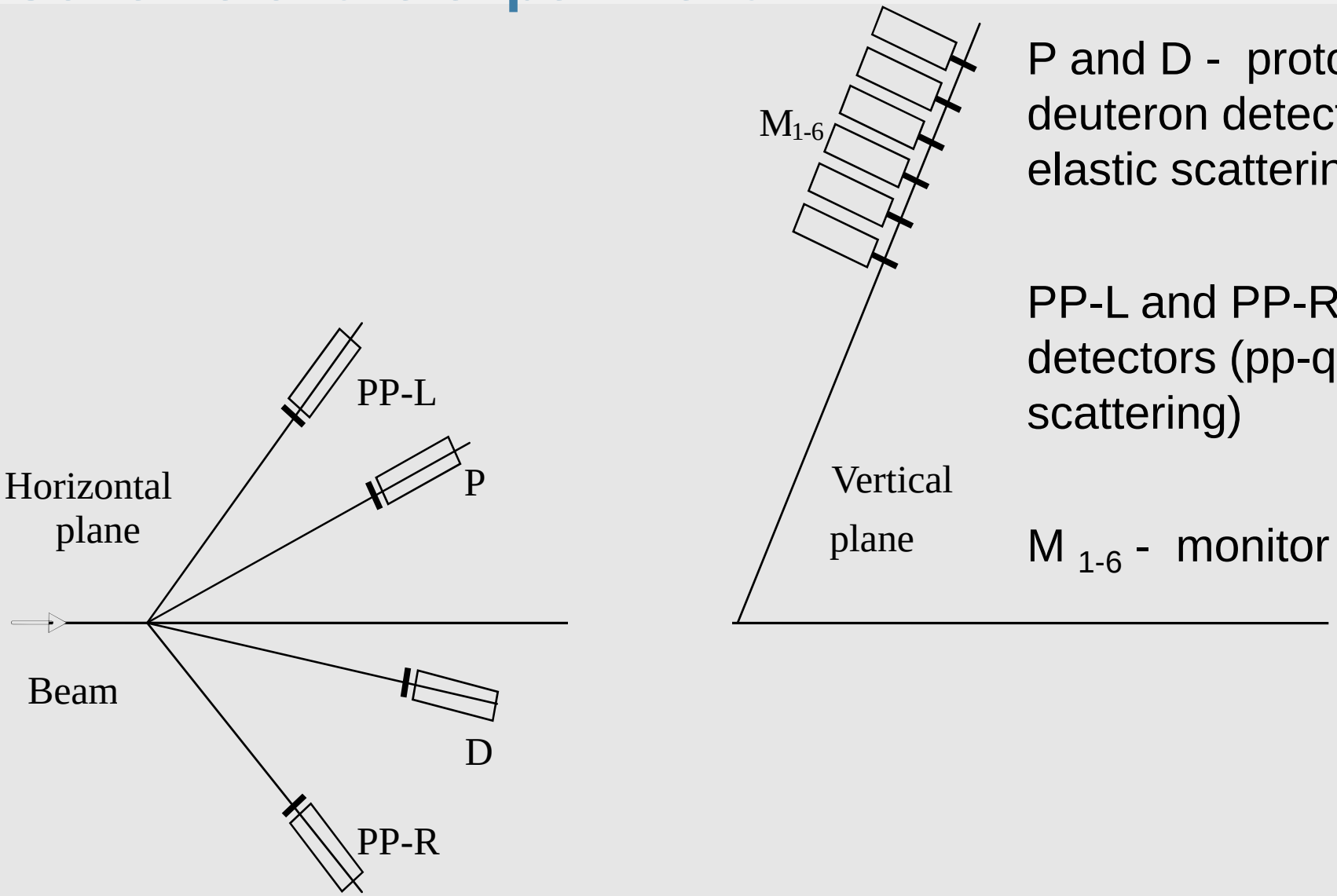
- The g ction of *dp*- range from 500-1000 MeV. This is needed for an experiment to measure analyzing powers for the *dp*-elastic scattering.

The main aim of present investigation is to measure the cross-section of *dp*-elastic scattering at the energy 880 MeV using kinematical coincidences of deuteron and proton with simple plastic scintillation counters and CH_2 and C targets at the internal target station at the Nuclotron.

Internal Target Station

Scheme of the experiment

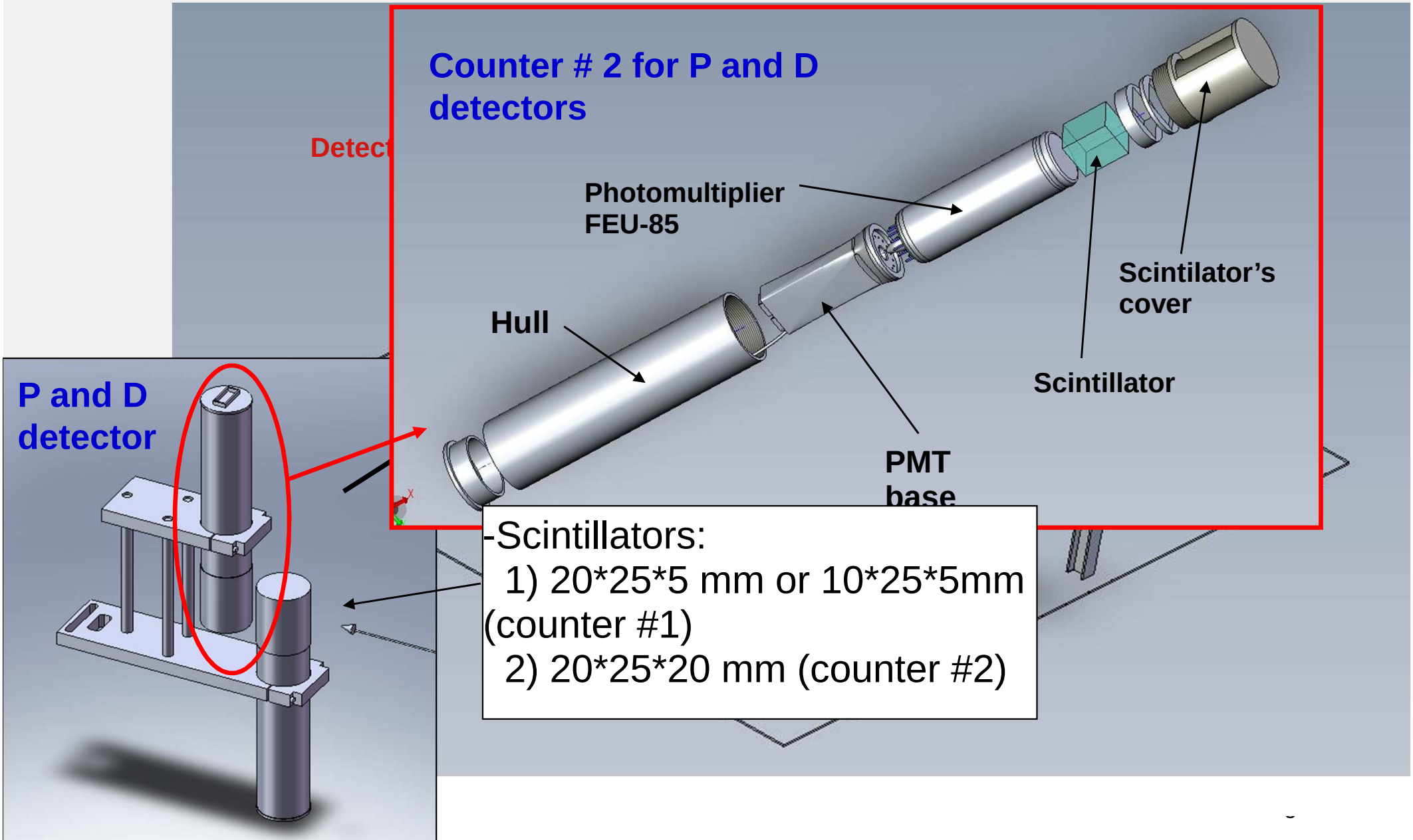


P and D - proton and deuteron detectors (dp-elastic scattering)

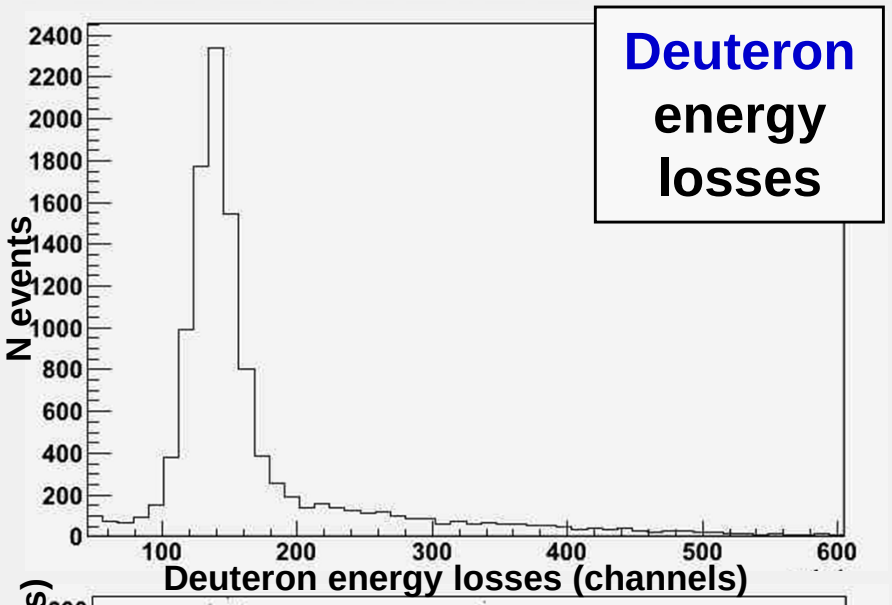
PP-L and PP-R –proton detectors (pp-quasi elastic scattering)

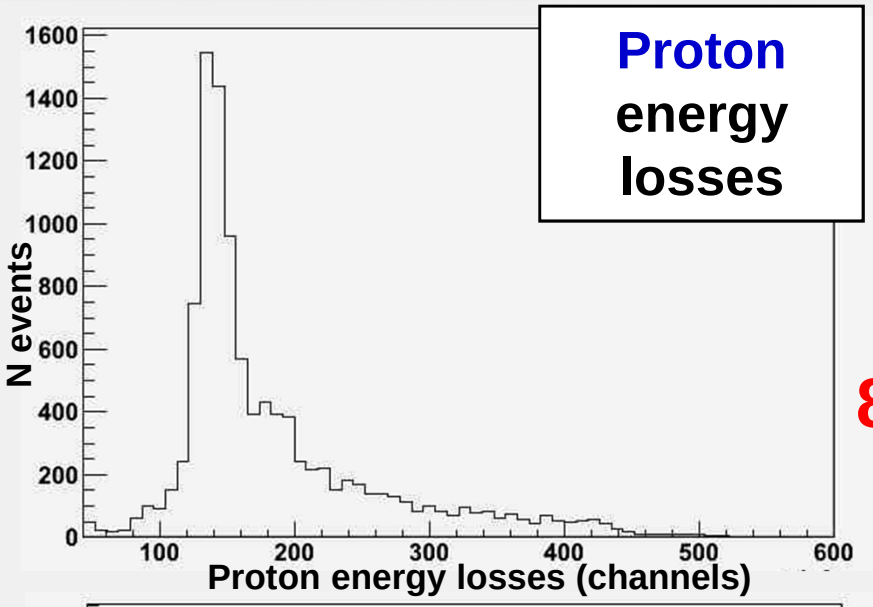
M_{1-6} - monitor counters.

Experimental setup at the Internal Target Station



Data handling

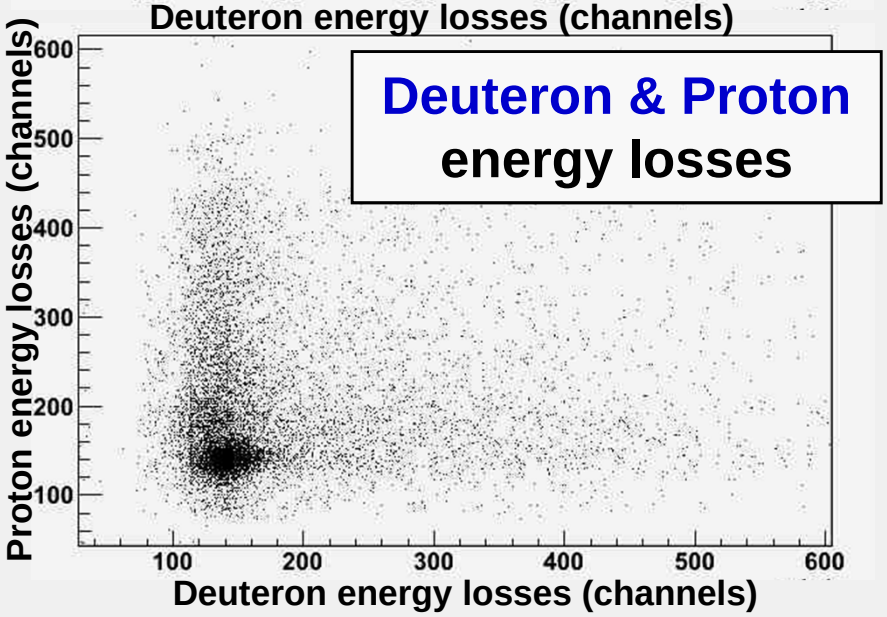


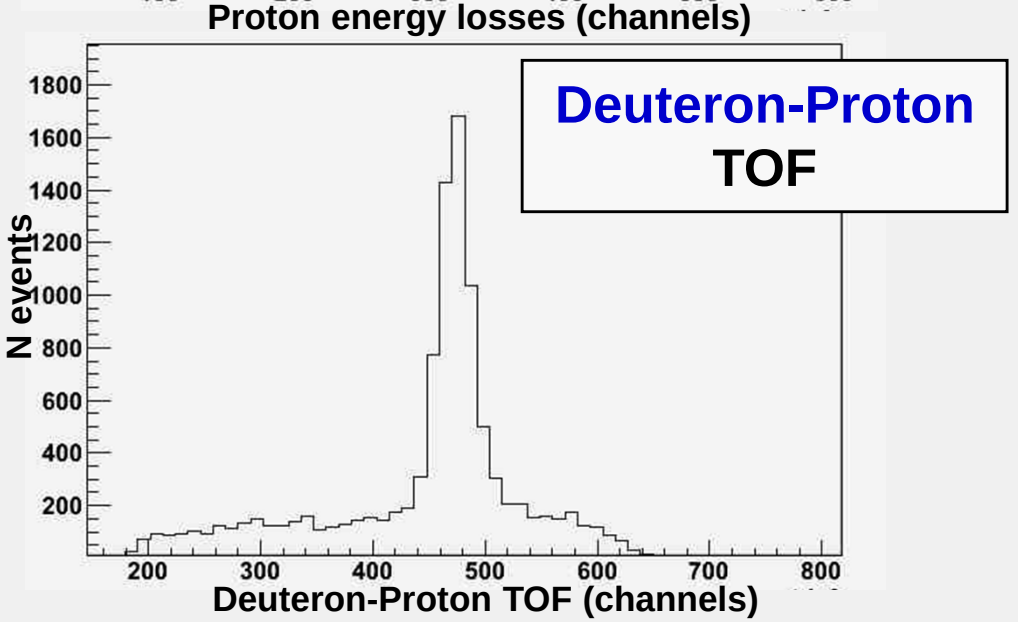


CH_2

DATA

880MeV





The results obtained at **880MeV** deuteron beam on **polyethylene** target: a) deuteron energy losses, b) proton energy losses, c) correlation of proton and deuteron energy losses, d) time difference between the signals for deuteron and proton detectors.

Data handling

TDC SPECTRA FITTING

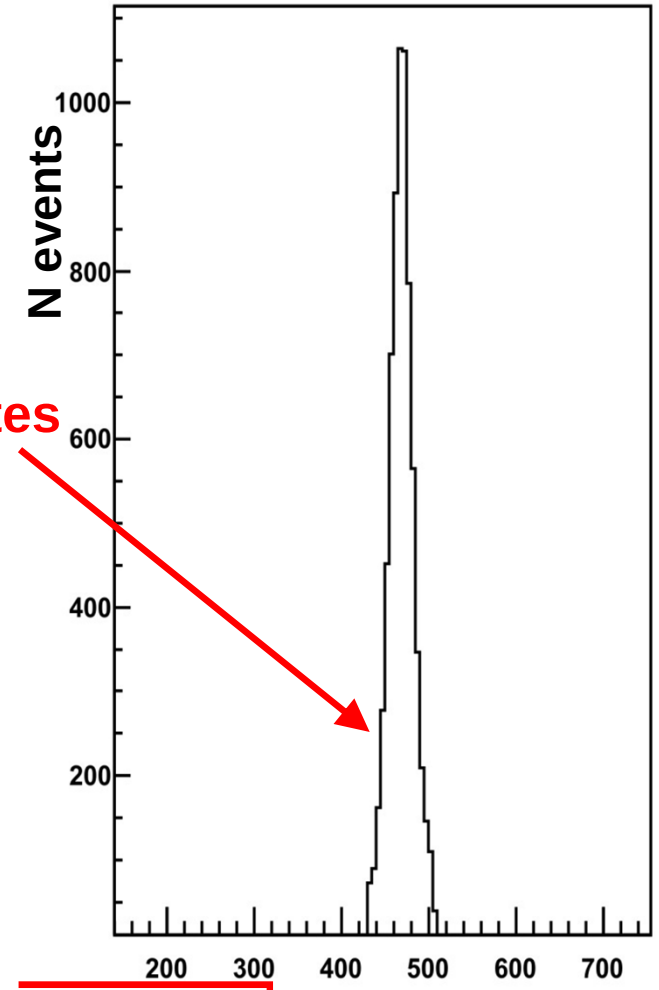
880 MeV

CH2 target

60 deg. c.m.

deuteron scattering

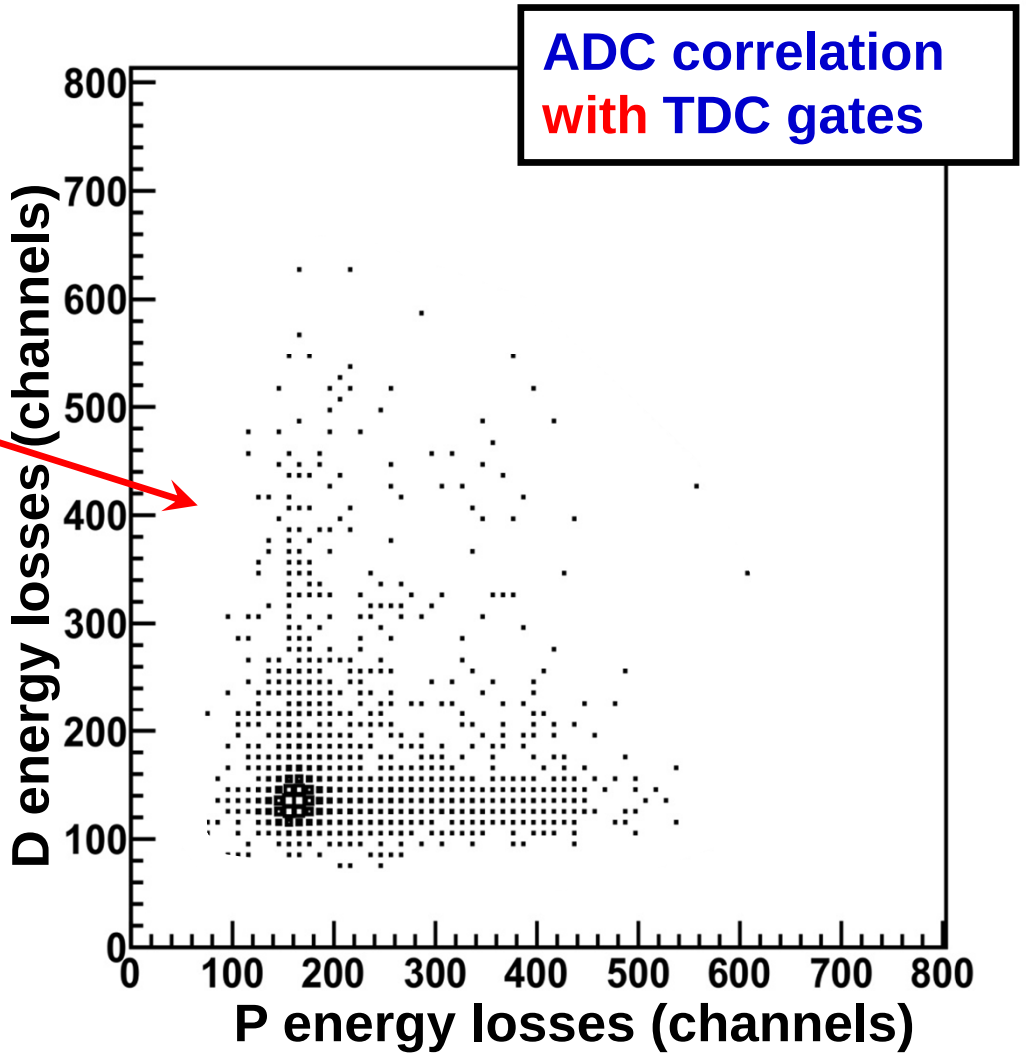
TDC spectra with gates



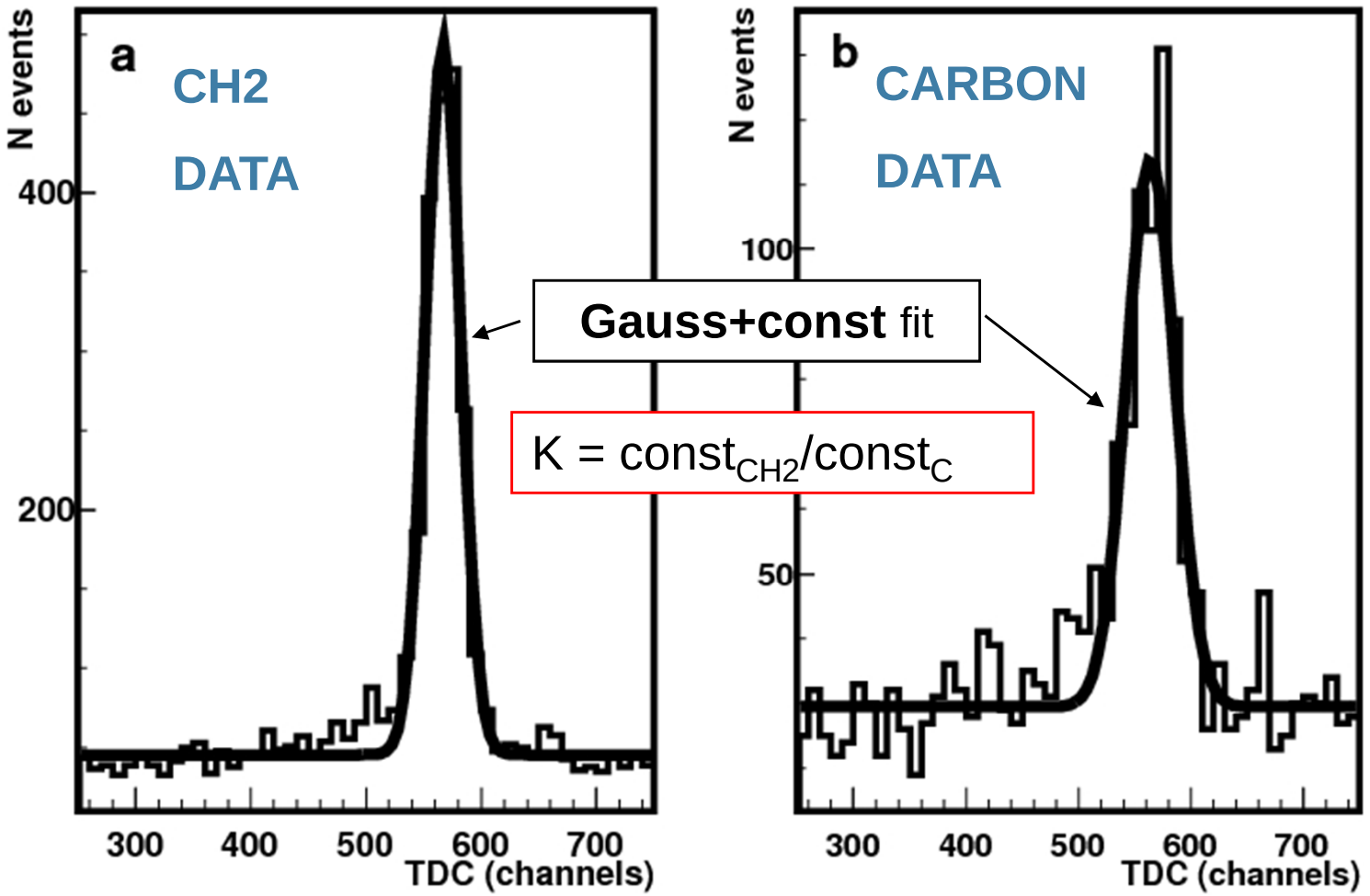
+ 4*Sigma

APPLYING ADC GRAPHICAL CRITERIA

ADC CORRELATION
GRAPHICAL CRITERIA

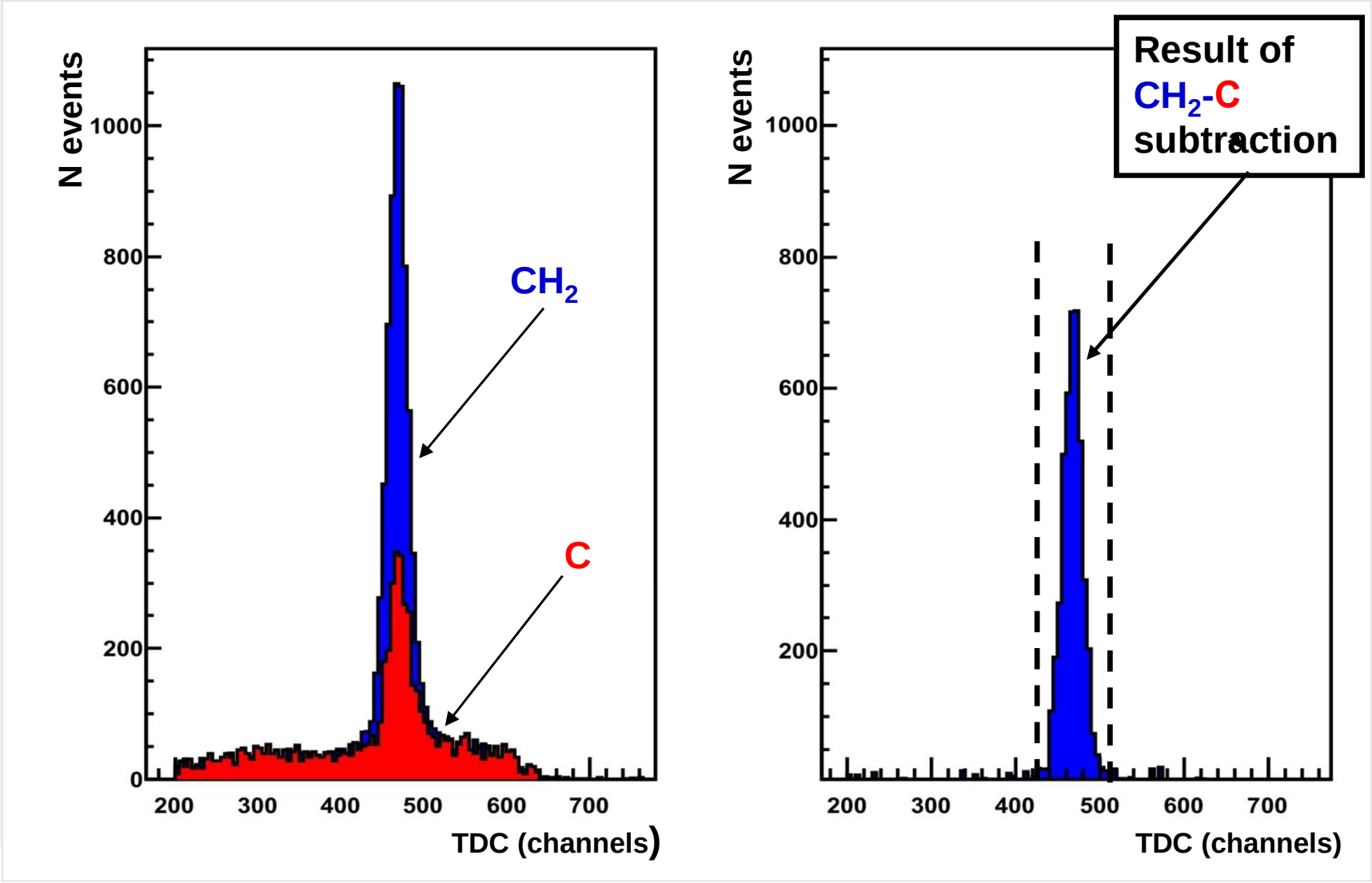


Getting normalization coefficient fitting the time difference spectra



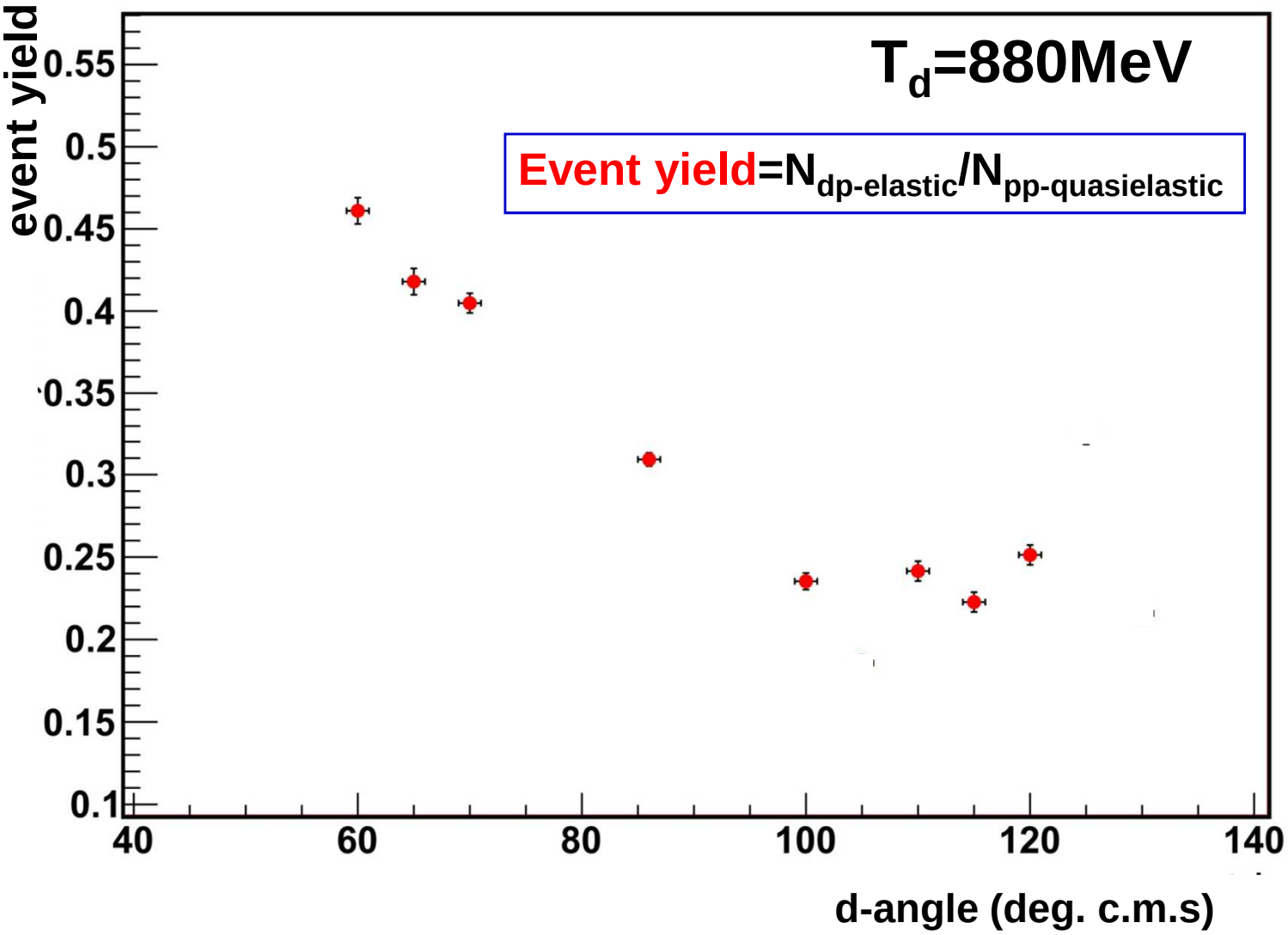
Time difference spectra obtained on polyethylene (a) and carbon (b) targets.

CH_2-C time difference spectra subtraction

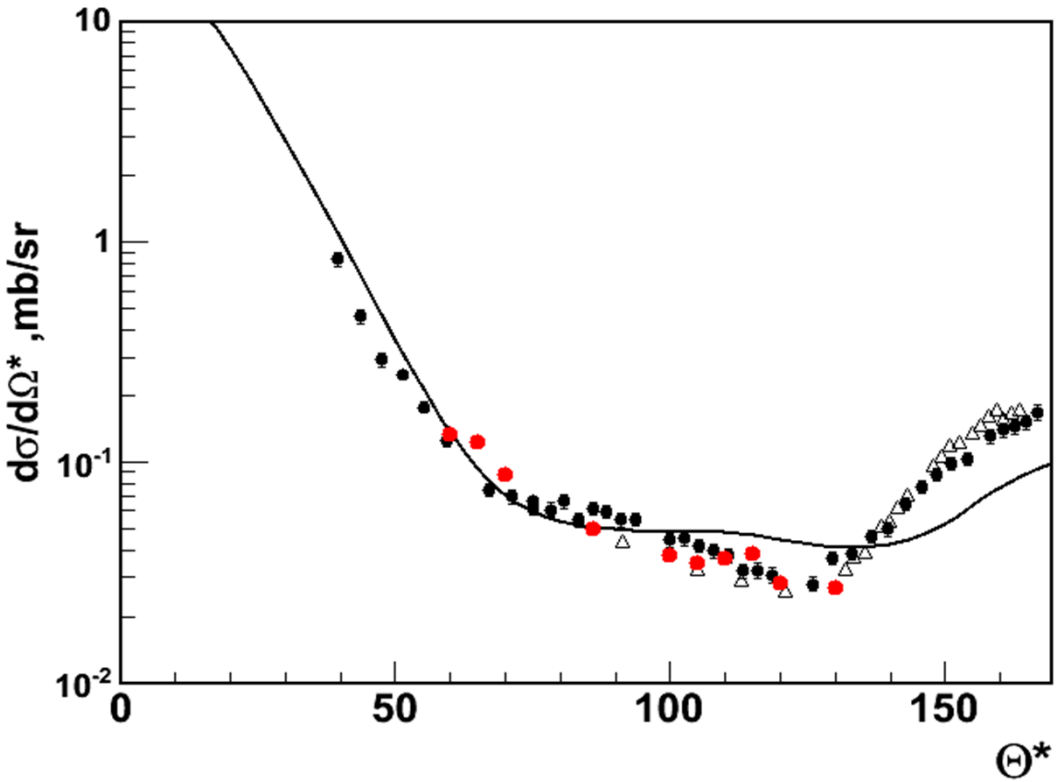


Time difference distribution for *dp*-elastic events obtained from CH_2-C

Event yield of *dp*-elastic scattering T_d=880 MeV



Cross section in *dp*- elastic scattering at 880 MeV



Red circles are the preliminary LHEP-JINR results.

World data:
N.E.Booth et al., Phys.Rev.D4 (1971) 1261
J.C.Alder et al., Phys.Rev.C6 (1972) 2010

Relativistic multiple scattering model calculation:
N.B.Ladygina, Eur.Phys.J, A42

- The results of the multiple scattering model are in agreement with the cross section data in the range 30 - 130º.
- Double scattering dominates over single scattering at the angles larger than 70º.
- Deviation of the data on the calculations at backward angles are related with the s-type of the FM 3NF.
- Is the deviation on the data from the calculations around 90º manifestation of 3N SRC?

Conclusions

The following results has been obtained:

- The procedure of the *dp*-elastic scattering cross-section measurements at internal target station at Nuclotron using CH_2-C subtraction has been established.
- The first results of the cross-section measurement in *dp*-elastic scattering at the energies of 880 MeV have been obtained. The results show the reasonable behaviour as the function of the scattering angle.
- The goal for the nearest runs is to measure the cross-section of *dp*-elastic scattering reaction in wide deuteron energy range with the step not more than 100 MeV in the region from 500-1000 MeV.

Collaboration

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THANK YOU!

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