

Reference on the ALPOM2 project
Measurement of analyzing powers for the reaction
 $p(\text{pol}) + \text{CH}_2$ up to 7.5 GeV/c
and $n(\text{pol}) + A$ up to 6.0 GeV/c at the Nuclotron

Main goal of the ALPOM2 project is measurements of analysing powers for nucleon (proton and neutron) scattering on different targets at polarized nucleon momentum up to 7.5 GeV/c at the JINR VBLHE accelerating complex. These investigations became available after completion of construction of the new polarized ions source, modernization of the LINAC and increasing energy of slow extraction beam.

Upgrade of the setup includes replacement of proportional chambers by drift chambers tubes in a head part of a track system and modernisation of registration electronics and data acquisition system. The new track detectors allow improving accuracy of scattered angle measurements. In order to reject low energy hadrons scattered from the target the hadron calorimeter was integrated in the experimental setup.

During beam runs in 2016-2017 years new experimental data of the analysing powers at neutron momentum 3.0, 3.75 and 4.2 GeV/c were obtained with different targets by registration a charged particle in forward direction. Unexpected significant asymmetries in np charge-exchange reaction on Cu that increase two times when the hadron calorimeter response applied are observed.

Taking into account this result a new proposal “Measurement of the Ratio $G_{\text{En}}/G_{\text{Mn}}$ by the Double-polarized ^2H ($e(\text{pol}), e' n(\text{pol})$) Reaction” has been approved.

It is planned to measure the vector analysing power of reaction $p + \text{CH}_2$ at polarized proton momentum of 7.5 GeV/c which was postponed by low intensity and polarization of primary deuteron beam.

After modification of the head part of neutron channel increasing neutron momentum upto 6 GeV/c a new data will be obtained for the highest possible neutron analysing powers.

The funding required from JINR (42 k\$) for modernization of the neutron chaneel and support of collaboration contacts should be considered as feasible.

I would recommend this proposal for prolongation for 2018-2021 years with the 1st priority.

Anatoli V. Zarubin, PhD, VBLHEP JINR

Anatoli.Zaroubin@cern.ch

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