

EXTRACTION OF NEUTRON-NEUTRON SCATTERING LENGTH FROM nn COINCIDENCE-GEOMETRY nd BREAKUP DATA

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We report preliminary results of a kinematically complete experiment on measurement of nd breakup reaction yield at neutron beam RADEX of Institute for Nuclear Research (Moscow, Russia). In the experiment two secondary neutrons are detected in geometry of neutron-neutron final-state interaction. Data are obtained at energy of incident neutrons $E_n = 40 - 60$ MeV for various divergence angles of two neutrons $\Delta\Theta = 4, 6, 8^\circ$. 1S_0 neutron-neutron scattering length a_{nn} were determined by comparison of the experimental dependence of reaction yield on the relative energy of two secondary neutrons with results of simulation depending on a_{nn} . For $E_n = 40$ MeV and $\Delta\Theta = 6^\circ$ (the highest statistics in the experiment) the value $a_{nn} = -17.9 \pm 1.0$ fm is obtained. The further improving of accuracy of the experiment and more rigorous theoretical analysis will allow one to remove the existing difference in a_{nn} values obtained in different experiments.

Keywords: breakup reaction, neutron, deuteron, neutron-neutron scattering length.