Contribution ID: **18** Type: **not specified**

Spin structure of the ”forward” nucleon charge-exchange reaction n + p —> p + n and the deuteron charge-exchange breakup

Wednesday 28 March 2012 14:15 (20 minutes)

The structure of the nucleon charge-exchange process
n + p −> p + n is investigated basing on the isotopic
invariance of the nucleon-nucleon scattering. Using the operator
of permutation of the spin projections of the neutron and proton,
the connection between the spin matrices, describing the amplitude
of the nucleon charge-exchange process at zero angle and the
amplitude of neutron elastic scattering on the proton
in the “backward” direction, has been considered. Due to the
optical theorem, the spin-independent part of the differential
cross-section of the process n + p −> p + n at zero
angle for unpolarized particles is expressed through the difference
of total cross-sections of unpolarized proton-proton
and neutron-proton scattering. Meantime, the
spin-dependent part of this cross-section is proportional to the
differential cross-section of the deuteron charge-exchange breakup
d + p −> (pp) + n at zero angle at the deuteron
momentum {\bf k}_d = 2{\bf k}_n ({\bf k}_n is the initial
neutron momentum). Analysis shows that, assuming the real part
of the spin-independent term of the “forward” amplitude of the
process n + p −> p + n to be smaller or of the same
order as compared with the imaginary part, in the wide range of
neutron laboratory momenta k_n > 700 MeV/c the main contribution
into the differential cross-section of the process n + p −> p + n
at zero angle is provided namely by the spin-dependent term .

Author: Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research, Dubna, Russia)

Co-author: Dr LYUBOSHITZ, Vladimir (Joint Institute for Nuclear Research, Dubna, Russia)

Presenter: Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research, Dubna, Russia)

Session Classification: Combined: Diffraction and vector mesons/spin physics

Track Classification: Diffraction and vector mesons/spin physics