MOMENTUM DISTRIBUTION OF NUCLEONS IN DEUTERON FROM QUASIELASTIC BREAK-UP AT 1 GeV

N.P.Aleshin, S.L.Belostotsky, O.G.Grebenjuk, V.A.Gordeev,E.N.Komarov, L.M.Kochenda, V.I.Lasarev, S.I.Manayenkov,O.V.Mikluho, V.V.Neljubin, V.N.Nikulin, O.E.Prokofiev, V.V.Sulimov, V.V.Vikhrov

Deuteron break-up reactions $pd \to pp(n)$ and $pd \to pn(p)$ have been investigated at 1 *GeV* with the help of a two arm spectrometer at the scattering angles $\Theta_1 = 20^0$, $\Theta_2 = 60^0$ for quasielastic geometry and in order to go out of the quasielastic geometry at $\Theta_1 = 30^0$, $\Theta_2 = 60^0$ [1]. The both reactions have been studied at the identical kinematic conditions in the momentum range up to $K = 0.5$ and 0.4 *GeV/c* for the neutron and proton spectator respectively.

Momentum distribution of nucleons in the deuteron $\rho\ (K)$ has been deduced from the data (fig.) using the simple Impulse Approximation formula for coincidence cross section

$$\frac{d\sigma}{d\Omega_1\, d\Omega_2\, dp_p} = KIN\ \frac{d\sigma}{d\Omega_{free}}\ \rho\ (K),$$

where KIN- is 3 body kinematical factor,

$\frac{d\sigma}{d\Omega_{free}}$ is the center of mass free pp or pn elastic scattering cross section.

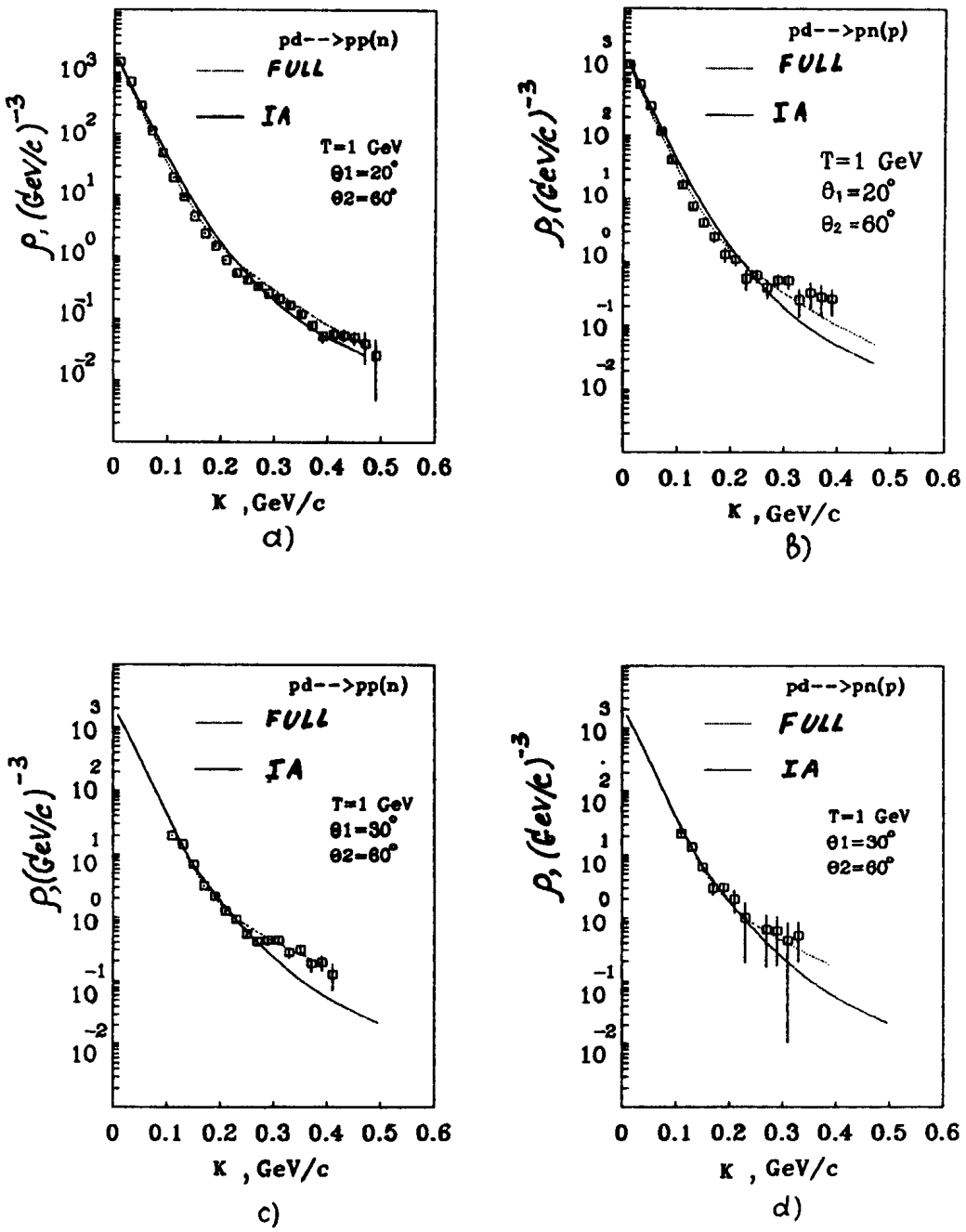

Fig. Momentum destribution of nucleons in deuteron $\rho(K)$ 0 from $pd \to pp(n)$ and $pd \to pn(p)$ reactions at 1 *GeV*. Solid lines are predictions of IA with Paris potential. Dotted lines are calculated with corrections for rescattering, FSI, and Δ-excitation

As it can be seen (fig.) there is a good agreement of the data obtained with the potential model description (Paris potential) up to $K \approx 0.3\ GeV/c$ (solid lines). An enhancement at higher momenta is well described when the corrections for the rescattering, FSI, and intermediate Δ-excitation are taken into account (dotted lines). Thus one comes to the conclusion that proceeding from the $\rho(K)$ data only, deuteron structure can be presented by two pointlike nucleons up to rather high internal momenta (small internucleon distances) without any evidence for manifestation of the quark structure and other fine effects.

Reference

1. Aleshin N.P., Belostotsky S.L. et al. Preprint LNPI-1740. 1991. Leningrad. 37 p.