

POLARIZATION AND DEPOLARIZATION IN pn -AND pp -SCATTERING AT 635 MeV

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Hitherto, the polarization in free pp - and quasi-elastic pn - and pp -scattering has been measured by means of scintillation counters in the angular range of 18.5 – 145.7° CM, and the depolarization parameter in the same scattering processes has been determined at an angle of 112.3° CM. For this purpose use was made of a proton beam with a degree of polarization P_1 equal to 0.515 ± 0.014 . The protons were scattered on CD_2^- , CH_2^- and C-targets.

The angular resolutions in the polarization and depolarization measurements amounted to ± 1.3 and $\pm 2^\circ$ LAB, respectively. The results of the measurements for depolarization and polarization are given respectively in Tables 1 and 2,* where $e_1 = P_1 P_1$; $e_2 = P_1 P_2$; $e_3 = P_1 P_3$; e_2 is the asymmetry of double scattering; P_2 is the polarization produced in pn (pp)-scattering; P_3 is the analyzing

Table 1.

Parameter	Quasi-elastic		Free pp -scattering
	pn -scattering	pp -scattering	
D	0.51 ± 0.39	0.67 ± 0.10	0.76 ± 0.08
e_{3n}	-0.086 ± 0.089	-0.024 ± 0.017	-0.007 ± 0.009
e_2	-0.166 ± 0.018	-0.146 ± 0.008	-0.150 ± 0.008
e_3	—	0.194 ± 0.010	—
e_1	—	0.189 ± 0.014	—

* The polarizations given in Table 2 should be multiplied by 1.18 ± 0.10 .

Table 2.

Angle CM	Quasi-elastic		Free pp -scattering
	pn -scattering	pp -scattering	
18.5	0.241 ± 0.046	—	0.250 ± 0.032
34.5	0.303 ± 0.036	0.353 ± 0.026	0.391 ± 0.020
45.7	0.200 ± 0.025	0.418 ± 0.026	0.396 ± 0.024
56.7	0.082 ± 0.025	0.357 ± 0.012	0.371 ± 0.020
67.3	0.040 ± 0.017	0.290 ± 0.021	0.284 ± 0.021
90.0	-0.222 ± 0.030	-0.008 ± 0.020	0.027 ± 0.012
112.5	-0.323 ± 0.034	-0.278 ± 0.014	-0.300 ± 0.014
134.3	-0.258 ± 0.029	-0.378 ± 0.017	-0.404 ± 0.016
145.7	-0.176 ± 0.058	—	-0.337 ± 0.034

power of a beryllium target; e_{3n} is the measured asymmetry of triple scattering.

A comparison of the results obtained here with those of [1–3] shows that the polarization and depolarization in quasi-elastic pp -scattering differs only slightly from the same parameters in free pp -scattering. Thus, it may be hoped that the polarization and depolarization found by these authors for quasi-elastic pn -scattering differ only slightly from the respective quantities for free pn -scattering.

REFERENCES

1. Golovin B. M., et al. JETP, 36, 433 (1959).
2. Meshcheryakov M. G., et al. JETP, 33, 37 (1957).
3. Kumeikin Yu. P., et al. JETP 38, 1451 (1960).