

Polarizations for ^{12}C ($p, 2p$) Reactions at 1 GeV

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It is a long-standing problem that the analyzing power A_y , for proton quasifree scattering is reduced from values predicted with NN interactions in free space. Since theoretical calculations based on the Schrödinger equation have failed to reproduce this phenomenon, it has been taken interest in as a phenomenon which shows appearance of a relativistic effect or a medium-modification effect in a QCD level.

In the case of ($p, 2p$) reactions, where a simpler reaction mechanism is expected, a distinct A_y reduction has been observed for the reaction leading to $1s_{1/2}$ -hole states at an incident energy of 500 MeV¹⁾. At 400 MeV, the analyzing power was compared for several target nuclei and it was shown that the reduction gives a monotone function of the nuclear density which contributes the reaction²⁾.

In this paper, we report on our new experimental result at 1 GeV, which is a significantly different energy from previous measurements mentioned above. In addition to a target dependence³⁾, which shows the density dependence effectively, of the polarization P , we have measured an angular distribution of it for a ^{12}C target. The preliminary result of the measurement is shown in Fig. 1. The data show consistent reduction from PWIA and DWIA calculations though the outgoing energies of protons distribute in a wide range, from 130 MeV to 890 MeV. This shows that the reduction is not likely nuclear-reaction originated one, such as a multi-step effect, which support the idea that the reduction is appearance of some medium effects in nuclear field.

- 1) A. Miller et al., Proc. 7th Int. Conf. on Pol. Phen. in Nucl. Phys. (Paris, 1990) p. C6-595; Phys. Rev. C57 (1998) 1756.
- 2) K. Hatanaka et al., Phys. Rev. Let. 78 (1997) 1014.
- 3) T. Noro et al., Proc. Int. Nucl. Phys. Conf. (INPC2001, Berkeley, 2001), AIP Conf. Proc. 610 p. 1034.

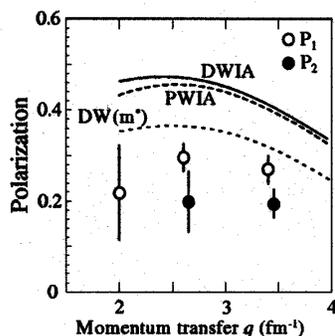


Figure 1: Polarization data for ($p, 2p$) reactions at an incident energy of 1 GeV. P_1 and P_2 correspond to polarizations of forward and backward outgoing protons, respectively. The kinematical condition is chosen so that the recoil momentum is zero. The line DW(m^*) shows a model calculation where relativistic effect is taken into account.