POLARIZATION TRANSFER IN THE ^{208}Pb(p,n) REACTION AT 135 MeV

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We measured the transverse-polarization transfer coefficient $K_{yy'}$ for the ^{208}Pb(p,n) reaction at 135 MeV. Data were taken at four angles: 0°, 3°, 6°, and 9°. These measurements were made with a neutron polarimeter utilizing the mineral-oil based scintillator BC-517L as an active analyzer. The polarimeter utilizes the analyzing power of n-p scattering from the hydrogen nuclei in the scintillator. Reactions of the type ^{12}C(n,np) appear to be the principal source of instrumental background in this device. Mineral-oil scintillators have much higher H:C ratios and absolute hydrogen densities than plastic scintillators, and therefore offer significant advantages for neutron polarimetry. The general layout of the polarimeter is as given in Ref. 1. Preliminary results indicate that the analyzing power of this new polarimeter is substantially higher than what we previously obtained with plastic-scintillator analyzers.[1] Figure 1 shows preliminary results from on-line and off-line determinations of the polarimeter performance. Also shown are the results of Monte-Carlo simulations of the polarimeter performance assuming only n-p scattering. The off-line analyzing power in the preliminary analysis is about 90% of the Monte-Carlo simulation; this is a substantial improvement over the 75% obtained with NE-102

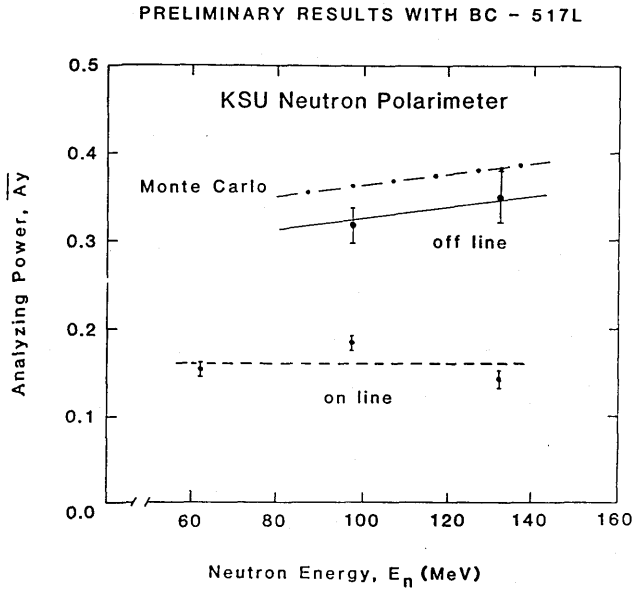

Figure 1. Preliminary measurements of the analyzing power for the KSU neutron polarimeter with BC-517L analyzer.

scintillator for the polarization analyzer, indicating that the background from ^{12}C(n,np) events has been reduced substantially. The software cuts for data anlysis are being studied to find the optimum set for analyzing the data from ^{208}Pb(p,n).

1) J.W. Watson, et al., in "Nucleon and Anti-Nucleon Scattering from Nuclei," eds. G.E. Walker, et al. (Plenum, New York, 1985) p.371; R. Madey et al., Proc. CEBAF 1985 Summer Workshop, eds. H. Crannell and F. Gross (CEBAF, Newport News, 1985) p.290.