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THE (p,n) REACTION ON CARBON ISOTOPES AT  $E_p = 160$  MeV

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Differential cross-section and analyzing powers for the (p,n) reaction on carbon isotopes have been measured for angles up to  $\Theta_L = 50^\circ$  using 160 MeV protons. An excitation energy spectra for (p,n) reactions on carbon isotopes at  $\Theta_L = 0^\circ$  is presented in Fig. 1. The angular distributions for the stronger transitions have been compared with the results of DWIA calculations which utilize transition densities from existing shell model calculations (Cohen and Kurath) and the free nucleon-nucleon interaction strength as parameterized by Franey and Love at  $E_p = 175$  MeV. The shapes of the calculated differential cross-section distributions are in reasonable quantitative agreement with the data for  $q < 1.2$  fm<sup>-1</sup> and the qualitative

differences in the distributions are well described even at higher  $q$ . The forward-angle cross sections for transitions with known B(GT) scale with the beta decay transition strengths, permitting the experimental determination of B(GT) for levels whose beta decay is energetically forbidden. The scale factor required for <sup>13</sup>C is different from that for <sup>12,14</sup>C. This effect has been noted in studies of other even and odd isotopes.

The total observed B(GT) for <sup>12</sup>C is in agreement with the predictions of CKWF. For <sup>13</sup>C and <sup>14</sup>C we obtain the missing strength fractions  $Q_{GT} = 0.46$  and  $0.60$  respectively, when comparing with CKWF. These results are consistent with global values of  $Q_{GT}$  presented elsewhere. The experimental and calculated

(CKWF) GT strength distributions for the carbon isotopes are presented in Fig. 2.

The shapes of the angular distributions are discussed emphasizing decomposition into longitudinal, transverse and non-normal-parity-transfer components.

Comparisons are made of the present data with corresponding  $(p,p')$  data and with other relevant  $(p,n)$  data.

A paper describing these results will be published in Phys. Rev. C.

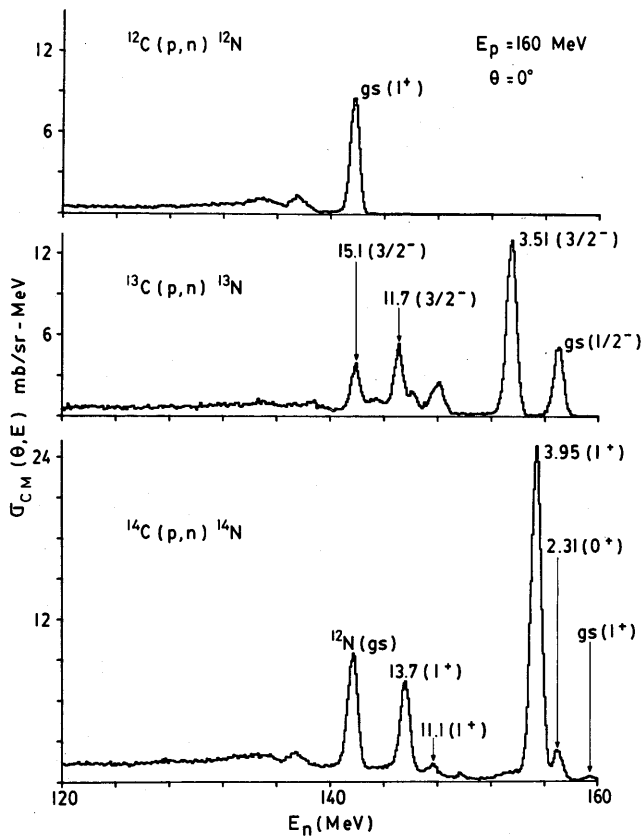


Figure 1. Excitation energy spectra for  $(p,n)$  reactions on carbon isotopes at  $E_p = 160$  MeV and  $\theta_L = 0^\circ$ .

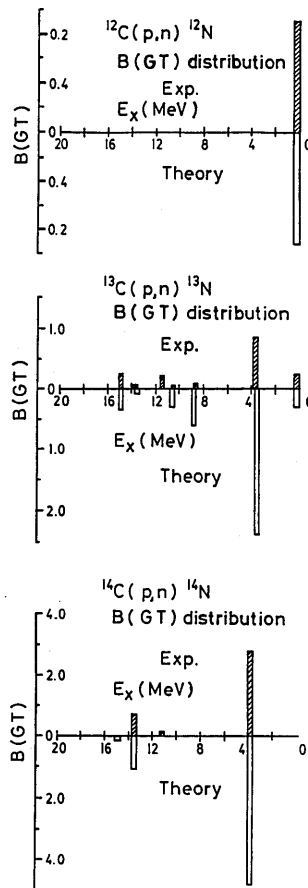


Figure 2. Experimental and calculated (CKWF) GT strength distributions for the carbon isotopes.