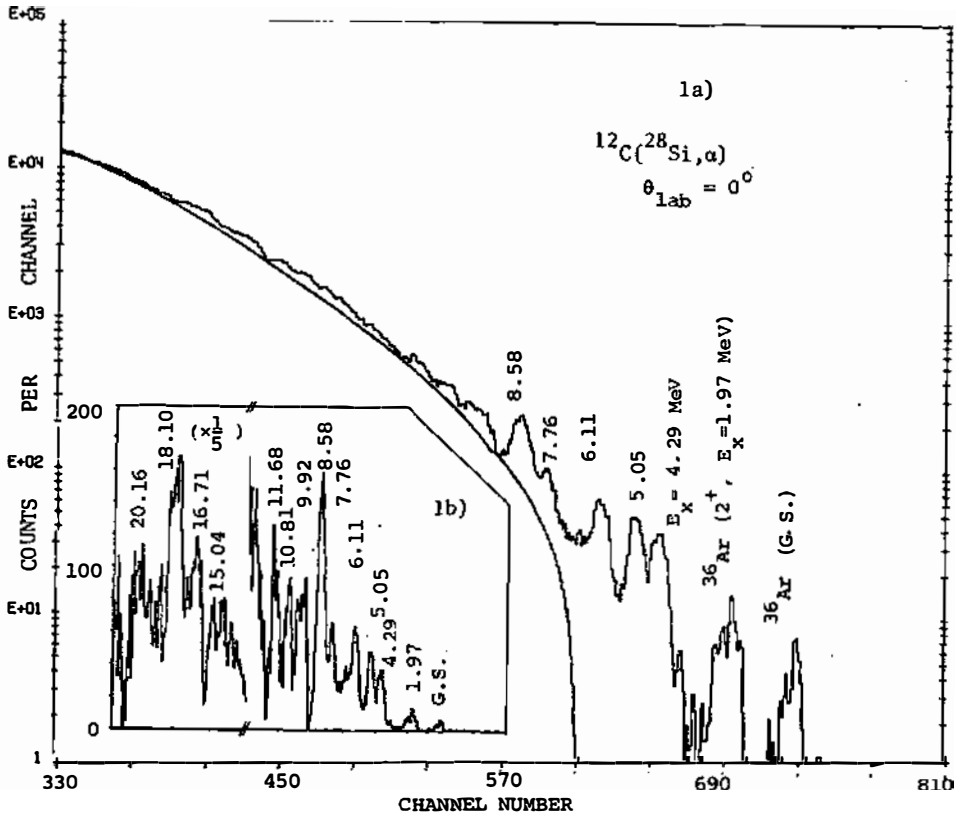


SELECTIVE POPULATION OF STATES IN ^{36}Ar BY THE
 $^{12}\text{C}(^{28}\text{Si},\alpha)^{36}\text{Ar}$ REACTION*

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Recent works¹⁾ have shown that states up to very high excitation energies in ^{24}Mg are populated by the $^{12}\text{C}(^{16}\text{O},\alpha)^{24}\text{Mg}$ reaction. It has been suggested that these transitions may arise from a ^{12}C transfer and lead thus to $(^{12}\text{C} + ^{12}\text{C})$ -like configurations in ^{24}Mg . It is interesting to look for similar phenomena in heavier systems with $A \approx 40$ where resonance-like features resembling those of $^{12}\text{C} + ^{12}\text{C}$ have been observed in elastic or inelastic scattering²⁾ and reactions³⁾ and may have a similar origin.



We present here results of a study of the $^{12}\text{C}(^{28}\text{Si},\alpha)^{36}\text{Ar}$ reaction. ^{28}Si beams from the 14UD Pelletron accelerator of the Heinemann Laboratory were used to bombard a $50 \mu\text{g}/\text{cm}^2$ natC target. α -particles were identified with a ΔE -E telescope at $\theta_{\text{lab}}=0^\circ$. A Ta absorber stopped the ^{28}Si beam before the detector. In order to emphasize transitions to discrete states in ^{36}Ar over the continuum of evaporation α -particles, spectra measured at different incident energies were corrected according to the kinematics of the $^{12}\text{C}(^{28}\text{Si},\alpha)^{36}\text{Ar}$ reaction and summed. Fig. 1a) shows the result of such a procedure for measurements at $84 \leq E_{\text{lab}} \leq 92$ MeV in 0.75 MeV steps. Fig. 1b) is obtained from 1a) by subtraction of the arbitrary smooth continuum spectrum shown. Transitions to the $^{36}\text{Ar}(\text{G.S.})$ and to the $^{36}\text{Ar}(2^+, 1.97 \text{ MeV})$ states are clearly resolved as well as transitions to states in ^{36}Ar up to 20 MeV excitation energy.

The mechanism for the observed transitions and the nature of the states selectively populated are not clear at this stage. Measurements are in progress at different incident energies and for different targets to investigate further the process.

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