

THE $^{40}\text{Ca} (n, ^3\text{He}) ^{38}\text{Ar}$ REACTION AT $E_n = 14.6$ MeV

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The $(n, ^3\text{He})$ reaction could be the simplest nuclear process for the study of two proton removal from nuclei. However, due to relatively high negative Q-values and low cross sections for $E_n \approx 14$ MeV, so far only total cross sections have been measured using activation technique [1].

Present experiment resulted in the first successful measurement of any (n, He) angular distribution. It was done by bombarding thin calcium fluoride target by 14.6 MeV neutrons, having the flux on the target of the order of $10^7 \text{ n cm}^{-2} \text{ s}^{-1}$, and detecting outgoing ^3He nuclei in a counter telescope, consisting of the proportional counters and a solid state detector.

The shape of the angular distribution for the ground state transition could reflect direct nature of this process. Total cross section is estimated to be of the order of 300 μb .

References:

- [1] S.M. Qaim, Radiochim. Acta 25 (1978) 13 and references therein.