

A STUDY OF THE ${}^7\text{Li}(p,n){}^7\text{Be}$ EXCITATION FUNCTION AT INTERMEDIATE ENERGIES
USING RESIDUAL ACTIVITY

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The objective of this experiment is to measure the excitation function of the ${}^7\text{Li}(p,n){}^7\text{Be}$ reaction in the proton energy range of $E_p = 60\text{--}200$ MeV. Such a measurement is needed to determine the total reaction cross section which in the course of other ${}^7\text{Li}$ studies can be used for calibration purposes.

The total cross sections are determined using standard off-line γ -ray detection techniques to measure the residual ${}^7\text{Be}(53d)$ activity. This method has been used at lower energies¹⁾ and at 120 MeV²⁾ to calibrate large volume neutron detectors.

Typically at each energy a $10\text{--}20$ mg/cm² enriched ${}^7\text{Li}$ target will be irradiated with $20\text{--}100$ na-hr of protons. After bombardment the irradiated target will be counted in a prescribed counting geometry with known γ -ray efficiency. The ${}^7\text{Be}$ is identified by its (10%) electron capture branch to the 477.4 keV level in ${}^7\text{Li}$. The samples will be counted over several months to insure the 477.4 keV γ -ray decays with the ${}^7\text{Be}$ half-life of 53.3d.

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- 2) C.A. Goulding, M.B. Greenfield, D.E. Bainum, J. Rapaport, C.C. Foster, T.E. Ward, C.D. Zafiratos, S.D. Schery, and C.D. Goodman, Bull. Am. Phys. Soc. 23, 558 (1978).