CROSS-SECTION MEASUREMENT
FOR THE $^7$Li(n,n't)$^4$He
REACTION AT 14.74 MeV*

by

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ABSTRACT

The cross section for the $^7$Li(n,n't)$^4$He reaction is measured at an average neutron energy of 14.74 MeV, with a resolution of 0.324 MeV, relative to the $^{238}$U neutron-fission cross section. Tritium activities for the irradiated lithium-metal samples (enriched to 99.95% in $^7$Li) are deduced using a liquid-scintillation counting method which relies upon the tritiated-water standard from the U.S. National Bureau of Standards. The measured cross section ratio of $^7$Li(n,n't)$^4$He to $^{238}$U neutron fission is 0.2523 ($\pm$ 2.2%). The derived $^7$Li(n,n't)$^4$He reaction cross section is 0.301 ($\pm$ 5.3%) barn, based on the ENDF/B-V value of 1.193 ($\pm$ 4.8%) barn for the $^{238}$U neutron-fission cross section.

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