

Abstract Submitted
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Pre-equilibrium nucleon emission and its effect on the surrogate measurement of $^{237}\text{U}(\text{n}, \text{f})$ H. AI, Yale, WNSL, C.W. BEAUSANG, University of Richmond, L. AHLE, L.A. BERNSTEIN, J.T. BURKE, J.A. CHURCH, K.J. MOODY, E.B. NORMAN, W. YOUNES, LLNL, D.L. BLEUEL, R.M. CLARK, P. FALLON, I.Y. LEE, A.O. MACCHIAVELLI, M.A. MCMAHAN, L.W. PHAIR, E. RODRIGUEZ-VIEITEZ, S. SINHA, M. WIEDEKING, LBL — The surrogate ratio technique of using surrogate measurements to estimate the cross section ratio of two different but similar reactions was found to be reliable by recent works. To further confirm the validity of the surrogate method, we performed an experiment at LBL to extract the $^{237}\text{U}(\text{n}, \text{f})$ reaction cross section from the surrogate $^{238}\text{U}(\alpha, \alpha'\text{f})$ reaction directly, without the use of ratios. Interestingly, the directly estimated $^{237}\text{U}(\text{n}, \text{f})$ reaction cross section was lower than that obtained by the ratio method for equivalent neutron energy above one neutron separation energy. A possible explanation is that a direct reaction has occurred where a single nucleon in the composite system is excited with enough energy to escape, leaving a nucleus with much less excitation energy deduced from energy of the scattered α beam. To check this we searched for scattered α 's in coincidence with other charged particles, and evidence of such events will be presented. This work was supported in part by U.S. DOE Grant No. DE-FG02-91ER-40609, DE-FG02-05ER41379, DE-FG52-06NA26206, and Contract No. W-7405-Eng-48, DE-AC03-76SF0098.

H. Ai
Yale, WNSL

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