Neutron-capture cross-section measurements of $^{40}$Ar and $^{136}$Xe in the energy region 0.7-14.8 MeV MEGHA BHIKE, WERNER TORNOW, Department of Physics/TUNL, Duke University — Cross-section measurements for the reaction $^{40}$Ar(n,γ)$^{41}$Ar have been carried out with the activation method in the neutron energy region 0.7-14.8 MeV. These results are important to identify backgrounds in liquid argon based neutrino detectors and in the neutrinoless double-β decay experiment GERDA, which uses argon as cooling and shielding medium. A high-pressure gas cell of $^{40}$Ar was irradiated with monoenergetic neutrons produced either by the $^3$H(p,n)$^3$He, $^2$H(d,n)$^3$He or $^3$H(d,n)$^4$He reactions. Indium and Au monitor foils were irradiated simultaneously to determine the incident neutron flux. The activities induced by the reaction products were measured using high-resolution γ-ray spectroscopy. The data are compared with the available data evaluations. Measurements of the $^{136}$Xe(n,γ)$^{137}$Xe cross section are underway and preliminary results will be presented as well. The latter data are important for the EXO and KamLAND-Zen neutrinoless double-β decay searches.

Megha Bhike
Department of Physics/TUNL, Duke University

Date submitted: 10 Jan 2013                                   Electronic form version 1.4