Level density and $\gamma$-strength function for $A=56-60$ nuclei\textsuperscript{1} A.V. VOINOV, C.R. BRUNE, S.M. GRIMES, M.J. HORNISH, T.N. MASSEY, Ohio University, Athens, Ohio 45701 — The knowledge of the compound nuclear cross sections is important in various fields of nuclear science and applications. The level density and $\gamma$-strength function are the main quantities needed for such calculations and corresponding experimental data are in high demand. Traditionally, the nuclear level density below the particle separation energy is determined from neutron resonance spacing and low-lying discrete levels by means of interpolation function based on Fermi-gas model. But the question of how reliable these level densities are for reaction rate calculations remains open. Differential cross sections with $^3$He and deuteron beams on $A=56-60$ nuclei have been measured at Edwards Laboratory of Ohio University. Level density parameters are obtained and compared to available systematics. The results on the $\gamma$-strength function for $^{56,57}$Fe nuclei obtained from ($^3$He,$\alpha\gamma$) and ($^3$He,$^3$He$'$\gamma) reactions measured at Oslo Cyclotron Laboratory will be presented. The data show a large enhancement relative to existing models in the low-energy region ($<3$ MeV).

\textsuperscript{1}This work is supported in part by U.S. DOE, grant No. DE-FG52-06NA26187

A.V. Voinov
Ohio University

Date submitted: 29 Jun 2006

Electronic form version 1.4