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Level density from evaporation spectra for proton rich nuclei
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QURAIISHI, MICHAEL HORNISH, THOMAS MASSEY, JOHN O'DONNELL,
AMERICO SALAS, Ohio University, Athens, Ohio 45701 — The level density is
an important characteristic of atomic nuclei. It tells us about the nuclear struc-
ture and is needed to calculate reaction rates. The experimental information about
the level density and corresponding model parameter systematics are available for
the nuclei close to the stability line but little is known for the nuclei beyond the
stability line. It follows from theoretical consideration that several physical effects
might give the of Fermi-gas parameter ‘a’ dependence on N and/or Z rather than
on simply on A [1]. To study this and other features, the level density from neu-
tron evaporation spectra has been measured for proton-rich nuclei ^{60}Zn and ^{56}Ni as
well as for corresponding stable nuclei ^{60}Ni and ^{56}Fe of the same A. Targets of ^{58}Ni ,
 ^{54}Fe , ^{58}Fe , and ^{55}Mn were bombarded with beams of ^3He and deuterium at Ohio
University’s Edwards Accelerator Laboratory. Neutron energies were determined by
the time-of-flight method. The different level density models have been tested in
the excitation energy interval up to 8-10 MeV and the best parameters have been
found. The results are compared to available systematics as well as to calculations
performed on the basis of microscopic model recommended in RIPL data base. [1]
S.I. Al-Quraishi, S.M.Grimes, T.N. Massey and D.A.Resler, Phys.Rev. C63, 065803
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