Nuclear properties in the vicinity of closed shells

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When approaching closed shells, nuclear structure changes significantly, and one expects this to influence the level densities and γ-strength function. Around closed shells, effects from the increasing single particle energy spacings can be expected. These will also influence the entropy difference between odd-mass and even-even nuclei. Therefore a statistical description of the transition from closed shells to deformed nuclei is of great interest.

Figure 1 shows the entropy deduced in the micro-canonical ensemble for ^{93,94}Mo (upper panel) and ^{97,98}Mo (lower panel). A simple, recently developed, single-particle plus pairing model [1,2,3] for investigation and classification of the pairing phase transition in hot nuclei will be presented. It could qualitatively explain the emergence of fine structures of the entropy. Different mechanisms governing the thermodynamic properties of odd and even systems will be discussed. It will be shown that using the saddle-point approximation the experimental level densities of even-even and odd-even system are reproduced.

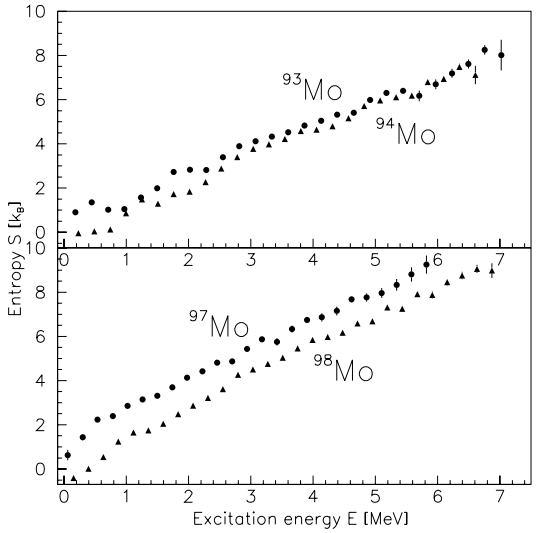

Figure 1: *Experimental entropy for ^{93,94}Mo (upper panel) and ^{97,98}Mo (lower panel) as function of excitation energy E.*

[1] M. Guttormsen *et al.*, Phys. Rev. C **63**, 044301 (2001).
[2] M. Guttormsen, *et al.*, Phys. Rev. C **64**, 034319 (2002).
[3] A. Schiller, *et al.*, Phys. Rev. C **66**, 024322 (2002).