

Excitation energy sorting in fission

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From more and more precise experiments on level densities, it is now rather well established that the logarithmic slope of the level density of medium-mass nuclei at moderate excitation energies varies only weakly with excitation energy. We have investigated for the first time the consequences of this behaviour for the sharing of excitation energy between the fission fragments at the scission configuration. We will show that this leads to a rather surprising energy-sorting mechanism where all the excitation energy is concentrated on the nucleus with the lower temperature, while the other one loses all its energy. This effect has important consequences for the understanding of even-odd effects in the fission fragment yields and of prompt neutron emission. In particular, the energy sorting effect explains in a transparent way why an increase of excitation energy is translated into an increase of the number of emitted neutrons for the heavy fission fragments only. This observation remained unexplained up to now.