Study of Single Particle Energies on Nuclear Level Densities

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The nuclear level densities are important input for calculating reaction cross sections, which are needed in many applications. In astrophysics reaction cross sections are needed for understanding nucleosynthesis and energy generation in stars. We examine the database of nuclear level densities over a wide range in A. Particular attention is given to the parameters in the formula proposed by Bethe. Preliminary results of a systematic study of the level density parameter and the spin cutoff parameter are presented. We also study how the single particle energies affect the nuclear level densities.