

Ecole Joliot-Curie:  
Nucleus through the Looking Glass  
Sep. 30 – October 5, 2012, Frejus - France

***“Aspects of Pairing in Atomic Nuclei ”***

**Problem 1**

Show that , indeed, the transition from spherical to deformed is expected to happen in nuclei.

**Problem 2**

Using Harmonic Oscillator trends, estimate the expected order of magnitude of the control parameter  $X$ , introduced in the two-level model.

**Problem 3**

Consider a closed shell nucleus. In the limit of pairing vibrational behavior, show that the two-nucleon transfer reaction cross section is proportional to the degeneracy  $\Omega$  of the single particle levels involved.

**Problem 4**

Consider next a mid-shell nucleus and show that the cross section is now proportional to  $\Omega^2$ .