What are the maximum spin and excitation energy of ^{254}No and its fission barrier?

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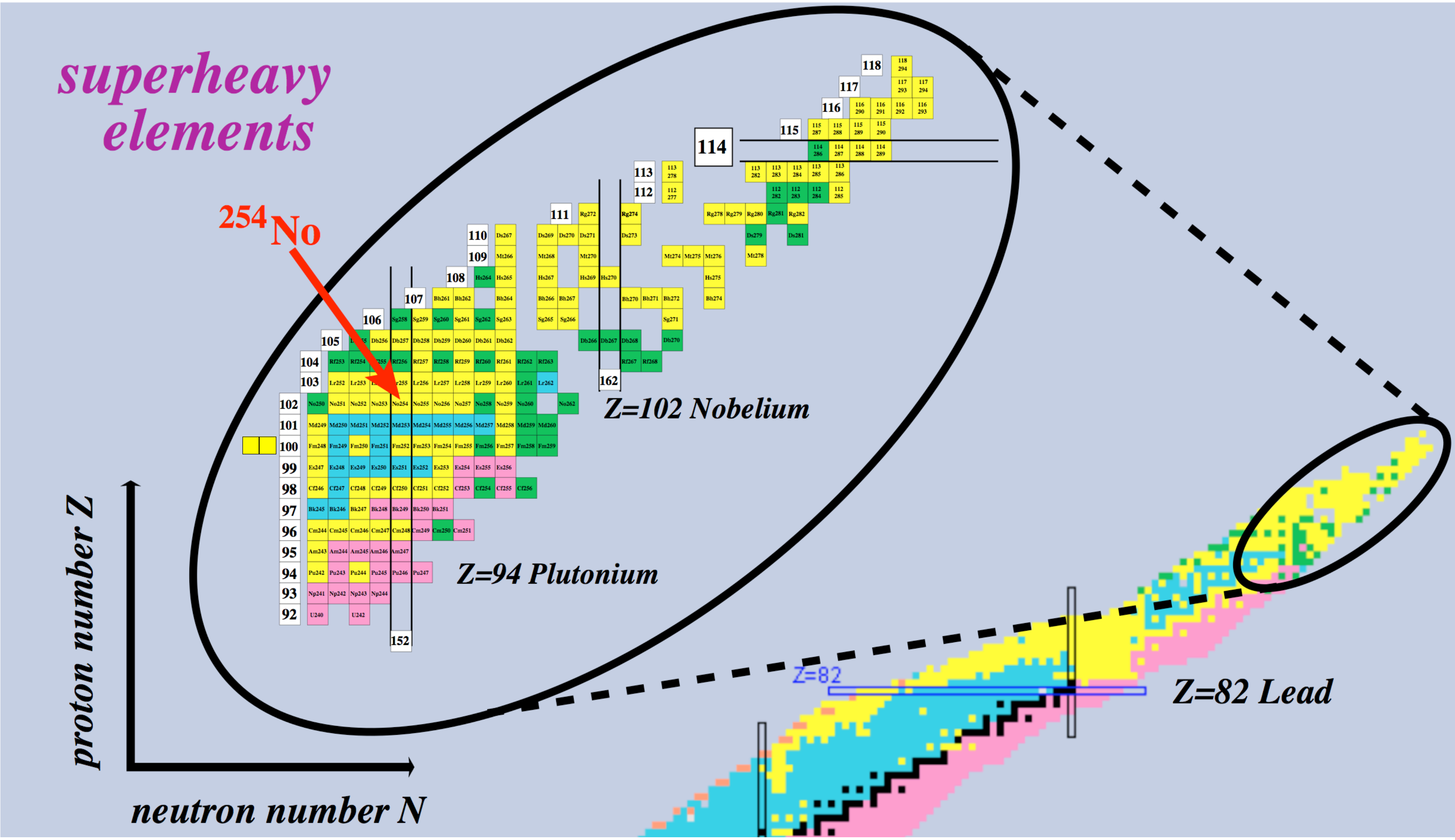
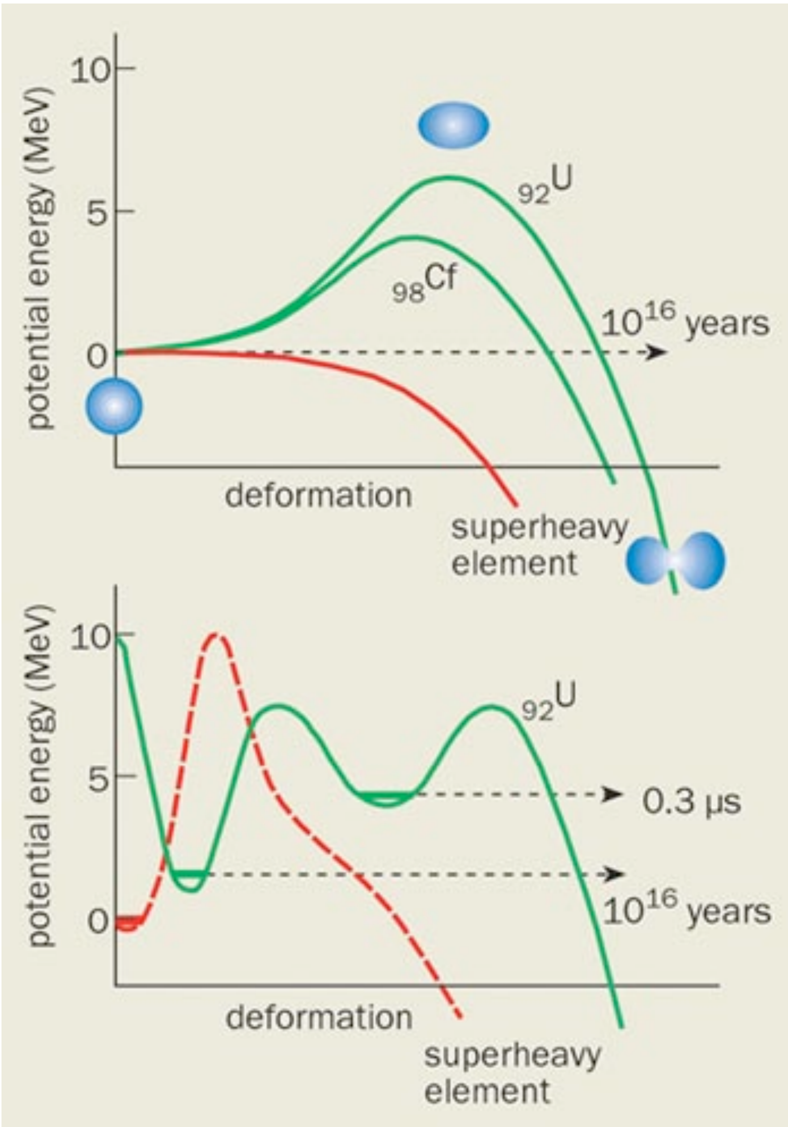
Setting the scene



Experimentally challenging !

Stability of heavy elements



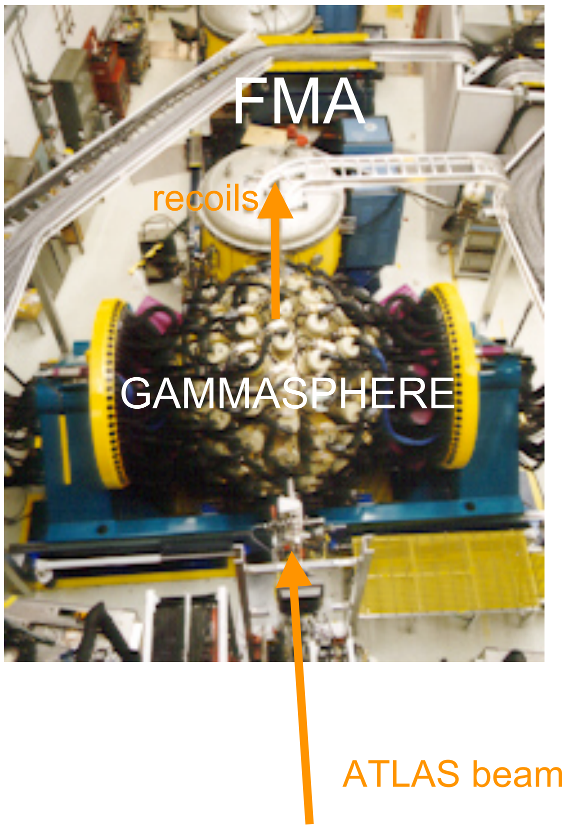
From a macroscopic viewpoint, the stability of nuclei is governed by interplay of Coulomb repulsion and surface tension. Nuclei with Z>100 should immediately fission.

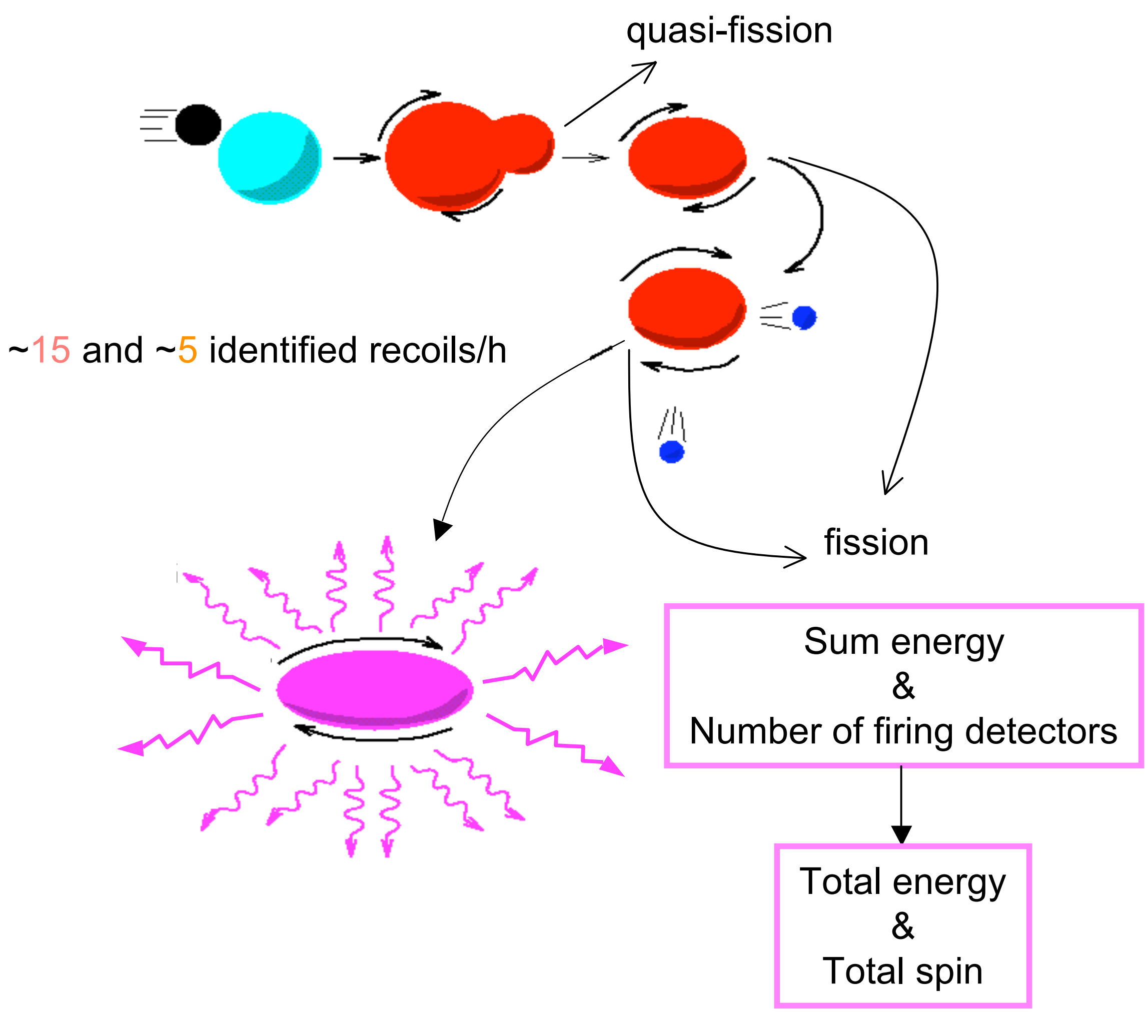
Nuclei with Z>100 owe their existence entirely to quantum effects. Regions of low level density in the single-particle energy spectra, quantum shell gaps, enhance the stability by creating a barrier in the potential energy surface of the nucleus.

Theoretically challenging !

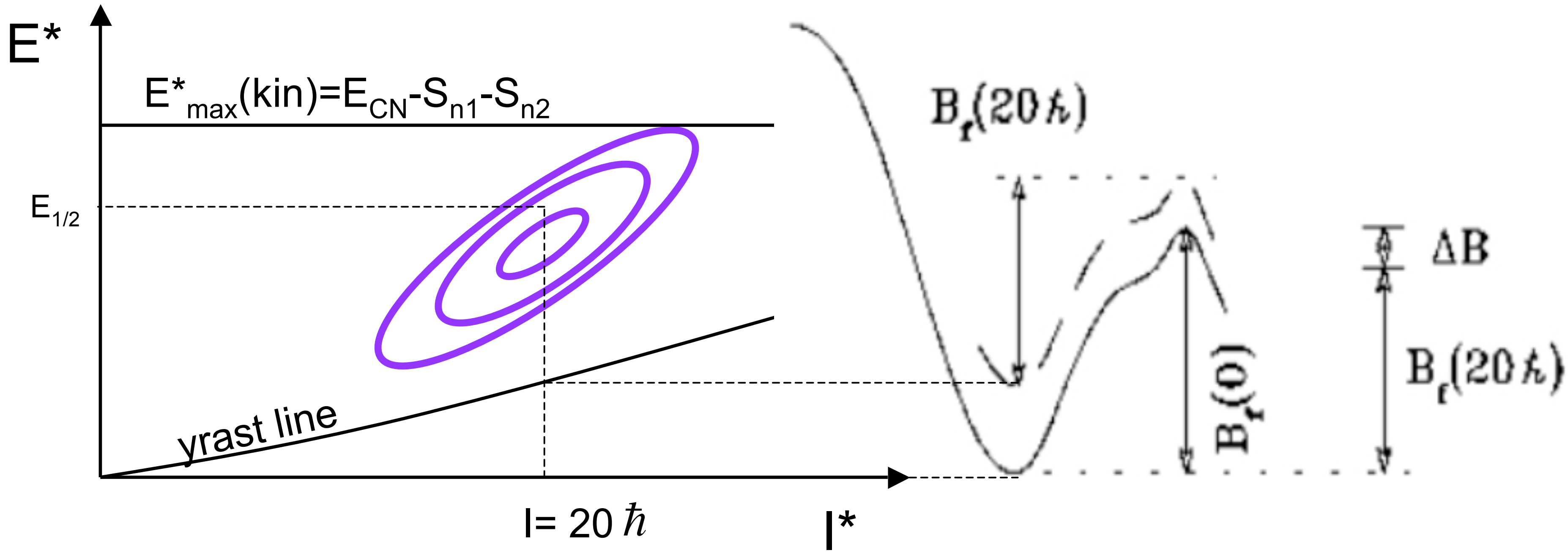
The experiment to measure $B_f(I)$ (April 2010)

The heavy nucleus ^{254}No was produced at high spin in the fusion-evaporation reaction ^{208}Pb(^{48}Ca,2n)^{254}No at 2 bombarding energies E_b = 219 and 223 MeV





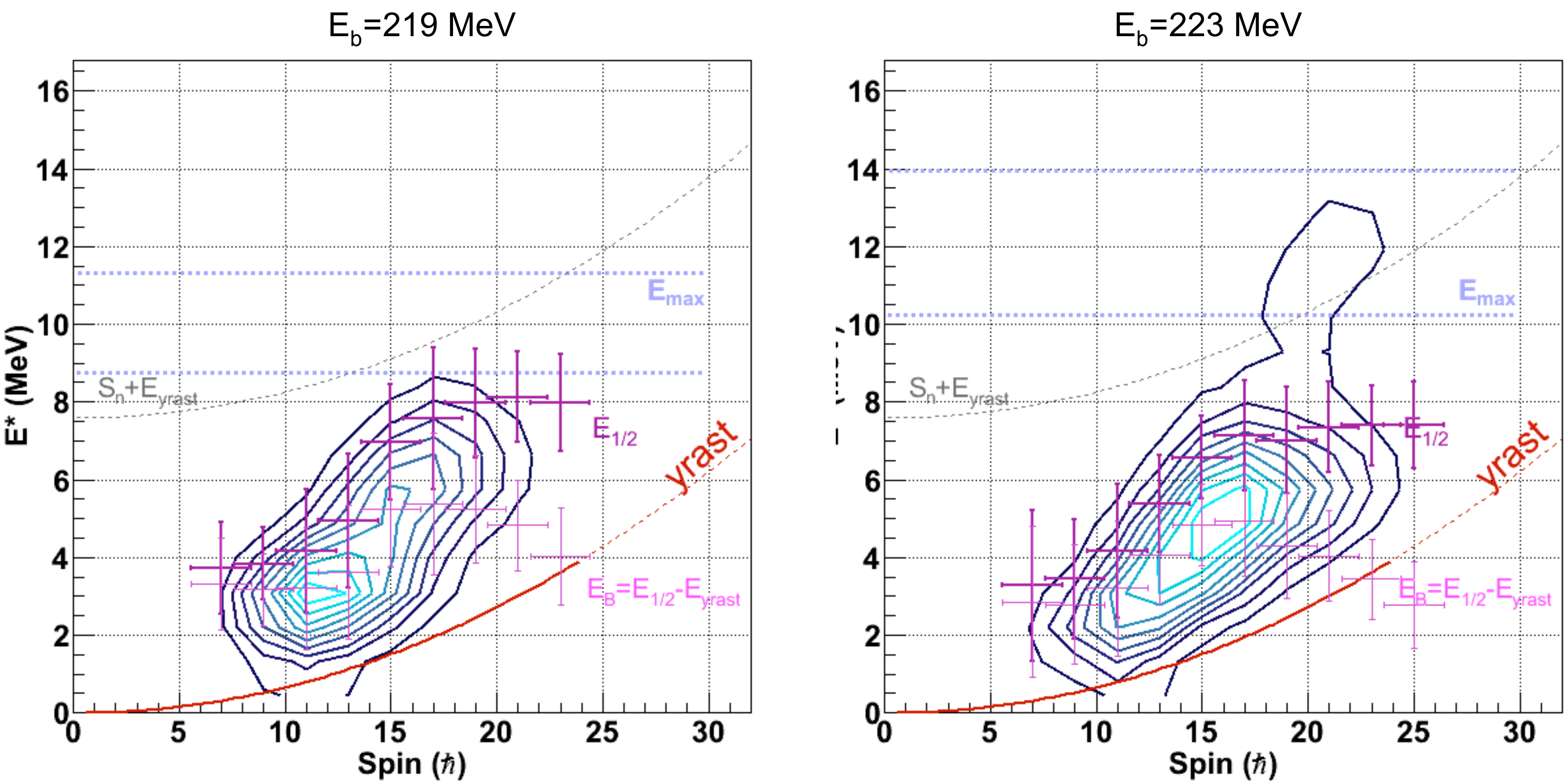
Extracting the fission barrier



$E_{1/2}$ (I) ≈ E_{saddle} (I) + (0- 0.5) MeV

B_f(I) = E_{saddle}(I) - E_{yrast} (I)

Preliminary results



Work to be done during visit:

- -Check data preparation & detector response
- -Compare to theory - ongoing discussions/calculations
- -Prepare article