

Abstract

Texas A&M seminar November 3, 2015

Los Alamos National Laboratory Preprint Number LA-UR-15-28128

Fission and Stability in the Heavy-Element Region in the Macroscopic-Microscopic Approach

P. Möller

Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM 87545, USA

I will briefly review some of the strengths of the macroscopic-microscopic nuclear-structure model, in particular its ability to, in practice, model a large number of nuclear properties in a correlated fashion. My main focus will then be to show and comment on recent results on fission properties, such as barrier heights, fission-fragment mass yields, and beta-delayed fission and what they tell us about the superheavy element properties and what could be next steps (theoretically and experimentally).

This summer our new “mass table” (FRDM2012) was accepted for publication in ADNDT. I will give some highlights of the results, which include apart from masses also ground-state deformations, ground-state spins, shape coexistence, beta-decay spectra and delayed neutrons, and the implications for SHE stability with respect to alpha and beta decay. I will discuss how we test the predictive power of the models.

Finally I will present a proposed method to calculate fission-fragment yields versus proton and neutron number $Y(Z, N)$ (a yield contour diagram in the Z - N plane with odd-even staggering included) and a first test on charge distribution calculations.