



独立行政法人理化学研究所 仁科加速器研究センター

第69回RIBF核物理セミナー

RIKEN Nishina Center for Accelerator Based Science

The 69th RIBF Nuclear Physics Seminar

FISSION AT THE END OF THE NUCLEAR CHART

Dr. Peter Möller (Theoretical Division, Los Alamos National Laboratory)

It is well-known that nuclei become increasingly unstable with respect to fission for increasing charge at the end of the periodic system. Since the late 1960's it has also been well established that fission barriers, or more generally fission potential-energy surfaces are complex functions of nuclear shape parameters such as elongation, shapes of the partially formed fission fragments, mass asymmetry, and neck radius. We have performed extensive studies of fission potential-energy surfaces of 5254 nuclei in the range $170 < A < 331$. Recently we submitted a comprehensive paper providing details of these studies to PRC, see

<http://t16web.lanl.gov/Moller/publications/PRCFIS-2008.html>.

There we present barrier heights for 1485 heavy nuclei, one number only, the maximum energy on the optimum path between the ground-state and separated fission fragments). However, we have determined many other features of the fission potential-energy surface for each of the 5254 nuclei. For example we have determined all minima and saddle points between minima and whether well-established valleys leading to scission (corresponding to different fission modes) appear in the fission potential-energy surface. We summarize our current results on fission barriers in the heavy-element region.

Electron-capture delayed fission is now studied for nuclei from proton numbers from 80 to about 100. For the lighter systems the structure of the calculated potential-energy surface and information from other models (such as our QRPA model of beta-decay intensities) tell us about (1) where EC delayed fission occurs, (2) the mean mass split in fission, (3) the symmetry of the mass distribution in fission, and (4) branching ratios between proton emission, EC-delayed fission, and other decay channels. We discuss the status of our modeling efforts in this area and present some preliminary insights from these efforts.

This theoretical work is a collaborative effort between Los Alamos (Kawano, Moller, Sierk), Riken (Ichikawa), and JAEA (Iwamoto).

**Dec. 19 (Fri), 2008 13:30-
Room 203- RIBF Building, RIKEN**

The seminar will be given in English.

Contact: RIBF Nuclear Physics Seminar Organizer

seminar@ribf.riken.jp

<http://ribf.riken.jp/~seminar>