Abstract Submitted
for the APR14 Meeting of
The American Physical Society

**Benchmarks of results obtained in the new finite-range droplet model**[1] PETER MOLLER, Los Alamos National Laboratory — The FRDM(1992) mass table has an accuracy of 0.669 MeV respect to a 1989 mass evaluation. The FRDM(2012) has an accuracy of 0.5595 MeV with respect to the AME2003 evaluation. There are several reasons for this improvement. A few are: 1) we calculate the potential energy in a 4D deformation space with densely spaced grid points, 2) we include axial asymmetry, and 3) we have improved the calculation of ground-state zero-point energies, A brief summary is in Phys. Rev. Lett. **108** (2012) 052501. Locally, substantial improvements are achieved, mainly in regions of shape coexistence. A troublesome staggering in the neutron separation energies in FRDM(1992) has almost disappeared. The $Q_\alpha$ values compare very well with experimental data up to $Z = 118$, which are very far (about 40 units in $A$) from the data to which the model was adjusted. This may bode well for reliability in the perpendicular direction towards very neutron-rich nuclei. We compare calculated masses, $\beta$-decay half-lives, $\beta$-delayed neutron-emission probabilities, ground-state spins and other quantities to experimental data. Also of interest to nucleosynthesis studies are our calculated fission-barrier heights and fission-fragment mass distributions in the heavy r-process region.

[1]Nuclear Security Administration of the U.S. Department of Energy at Los Alamos National Laboratory under Contract No. DE-AC52-06NA25396

Peter Moller
Los Alamos National Laboratory

Date submitted: 10 Jan 2014 Electronic form version 1.4