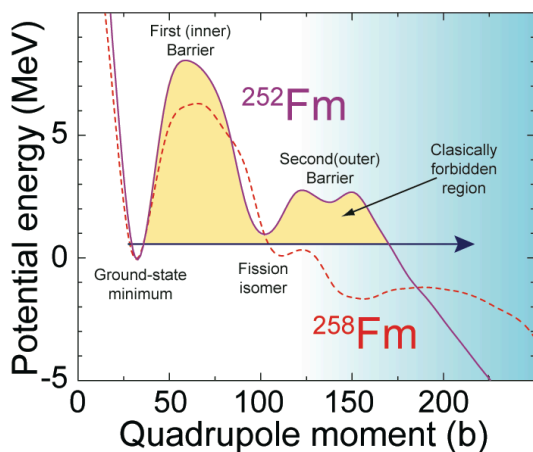
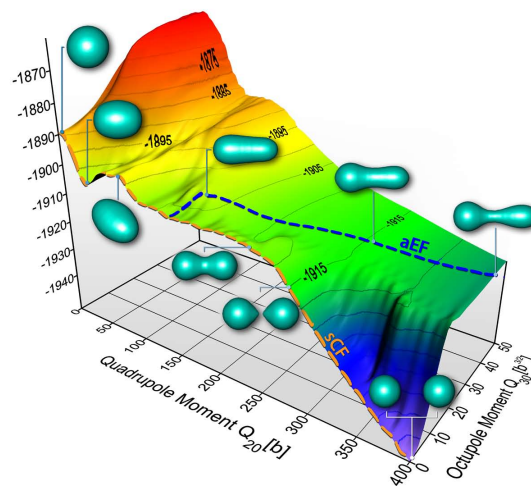
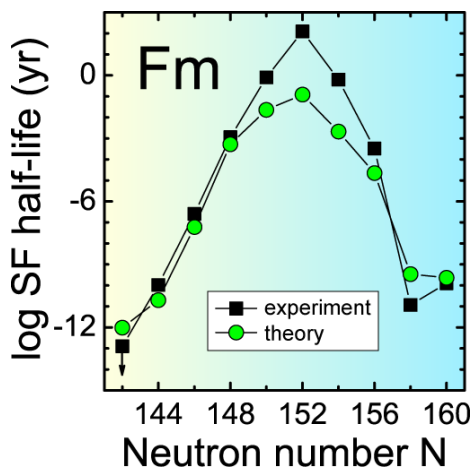
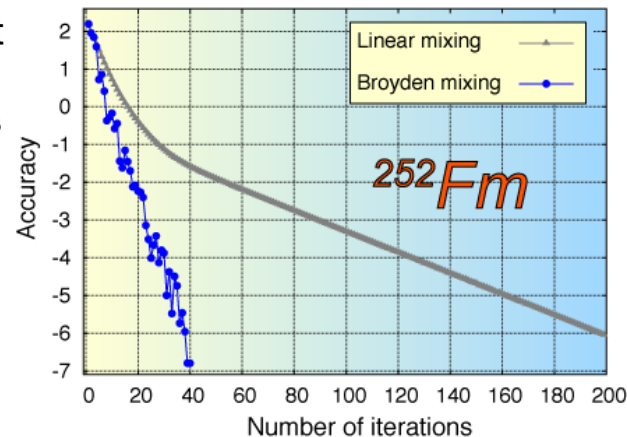


Microscopic description of nuclear fission

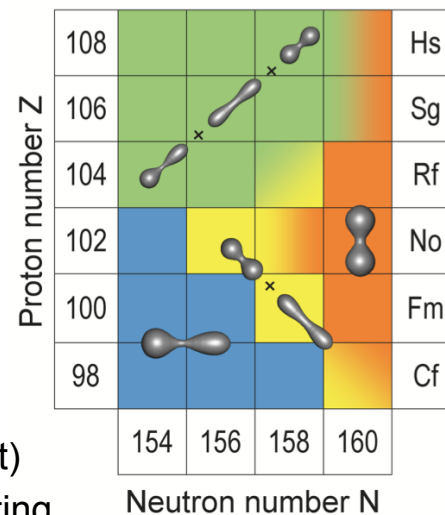
Advanced theoretical methods and high-performance computers may finally unlock the secrets of nuclear fission, a fundamental nuclear decay that is of great relevance to society



- The nuclear many-body problem is difficult
- Much of the progress in fission theory has been based on phenomenological models
 - This limits our predictive capability
 - ... and makes it difficult to estimate the uncertainties



- There are fundamental problems in fission that cry to be solved. Success will impact:
 - Basic science (nuclear structure and astrophysics)
 - Societal applications (energy, defense, environment)
- Fission is a perfect problem for extreme scale computing
- We are developing a *microscopic* model for fission that will be predictive and extendable. The figures show progress:
 - Calculating pathways and half-lives
 - Greatly improving calculation speed



UNEDF SciDAC Collaboration
Universal Nuclear Energy Density Functional