Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

Developing a computer code simulating recoil-beta decay tagging of fission products BERTA DARAKCHIEVA, University of Richmond — Neutron-rich nuclei far from stability exhibit insightful structural patterns and deformations, and can be used for testing existing nuclear theories. However, experimental information on many such nuclei is lacking, because they are hard to produce directly or through fusion-evaporation reactions. One way to populate light neutron-rich nuclei is by exploiting the fission process. Since these nuclei are primarily beta emitters, a technique of recoil beta tagging can be employed. A gas-filled separator, such as SASSYER (WNSL) or BGS (LBNL), can be used to select a mass window of fission fragments, which will be implanted on a DSSD detector located at the focal plane of the separator. By selecting high beta-endpoint energies, characteristic for the nuclei of interest, decays at the DSSD can be correlated to emitted gamma rays for further spectroscopy studies. An essential step in planning this project would be the development of a computer simulation of count rates at the DSSD. The program works by reading in files of half-lives and fission yields and uses a step-by-step iteration process. The role of the code is two-fold: to help identify a suitable nucleus for study and to optimize a mass window for its highest count rate. To test the method, experiments are planned with a fission source, such as Cf-252, placed at the target position of a recoil separator. If successful, the technique could be extended to in-beam experiments.

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Date submitted: 01 Aug 2008 Electronic form version 1.4