

Decay γ -spectroscopy of neutron-rich Ge - Br isotopes around $A \sim 90 - 100$

Nuclear data calculated by theoretical models play a large role in our understanding of the r-process due to the experimental difficulties in producing these very neutron-rich nuclei directly. In turn, experimental data are crucial in validating and constraining these models with the focus often on nuclear masses, half-lives and neutron emission probabilities. Nuclear structure also plays a key role and cutting-edge nuclear models have shown decay properties such as half-lives and P_n values to exhibit significant sensitivity to both nuclear shape and the competition between allowed Gamow-Teller (GT) and first-forbidden (FF) β -transitions. This sensitivity is particularly evident around shell closures and the mid-shell region. However, little to no γ -spectroscopy data exist for neutron-rich isotopes in the $N \sim 60$, $A \sim 90 - 100$ region.

Installed at RIKEN Nishina Center's RIBF facility since 2016, the BRIKEN collaboration has significantly extended the envelope of known decay data for β -delayed neutron emitters between $A = 70$ and 170, contributing hundreds of new and more precise β -decay half-lives and neutron emission probabilities. In addition to the silicon implantation detector AIDA and the array of ^3He neutron counters, the BRIKEN array also includes two HPGe clovers to allow coincident γ -ray spectroscopy.

Presented here is the first look at γ -spectroscopy data obtained using the BRIKEN detector in neutron-rich Ge, As, Se and Br isotopes around $N \sim 60$ and $A \sim 100$. This region shows a mini-peak in observed r-process abundance distribution, most likely originating from nuclear structure effects like strong deformation. However, despite a similar potential production mechanism, this area has so far received much less attention from the r-process community than the rare-earth peak at $A \sim 160$. This analysis offers a first look into the decay patterns of the most neutron-rich Ge, As, Se and Br isotopes.

Supervisor

I. Dillmann

Funding Agency

NSERC

Supervisor Email

dillmann@triumf.ca

Your Email

cgriffin@triumf.ca

Primary authors: GRIFFIN, Chris (TRIUMF); DILLMANN, Iris (TRIUMF); CABALLERO-FOLCH, Roger (TRIUMF); Mr SEXTON, Lewis (TRIUMF); CARPENTER, G. (TRIUMF); RYKACZEWSKI, KP (Oak Ridge National Laboratory); TAIN, Jose-Luis (IFIC Valencia); GRZYWACZ, RK (Oak Ridge National Laboratory); NISHIMURA, Shunji (RIKEN Nishina Center)

Presenter: GRIFFIN, Chris (TRIUMF)

Session Classification: Poster Session

Track Classification: Poster