

Contribution ID: 141

Type: Oral

β-decay strength distributions of neutron-rich isotopes for r-process nucleosynthesis

Tuesday, 14 June 2022 15:50 (20 minutes)

Approximately half of the elements heavier than iron are thought to be produced in the r process. Recent insights into the astrophysical site of this critical process highlight the need for experimental data on short-lived neutron-rich nuclei. R-process nucleosynthesis sensitivity studies show that the final abundance distributions of r-process nuclei are greatly impacted by β -decay properties, such as half-lives and β -delayed neutron-emission probabilities [1]. To inform global models used to calculate these properties, the β -decay strengths for a series of neutron-rich Co isotopes have been measured using the technique of total absorption spectroscopy with the Summing NaI (SuN) detector. The resultant β -decay intensities and deduced Gamow-Teller strengths are compared to QRPA calculations, which are typically used in r-process models. Results from several different experiments will be presented along with determined trends which may inform future theoretical calculations.

This work was supported by the Laboratory Directed Research and Development Program at Pacific Northwest National Laboratory operated by Battelle for the US Department of Energy.

[1] M. R. Mumpower, R. Surman, G.C. McLaughlin, A. Aprahamian. Progress in Particle and Nuclear Physics 86 (2016), 86-126.

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Session Classification: NS2022 Plenary

Track Classification: Oral Presentations