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

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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.

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[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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