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Investigation of the nuclear structure of 33Al through beta-decay of 33Mg to probe the island of inversion[1] TAMMY ZIDAR, University of Guelph, GRIFFIN COLLABORATION — Away from the valley of stability, some nuclei have been found to have ground state properties that are different than those naively expected from the nuclear shell model. Around the "island of inversion", N = 20 closed shell nucleus ^{32}Mg has large ground state deformations occur in association with intruder configurations from the $f_{7/2}$ shell. The nuclear structure of transitional nuclei, in which the normal and intruder configurations compete, can be used to inform theoretical models used to explain the inversion mechanism. ^{32}Mg is known to have a deformed ground-state configuration, while ^{34}Si displays a normal one. In the present work we studied the intermediate ^{33}Al through the β-decay of ^{33}Mg to clarify conflicting previous results regarding its structure. ^{33}Mg was delivered to the GRIFFIN high-purity germanium γ-ray spectrometer coupled with the SCEPTAR plastic scintillator β particle detector. High efficiency of the GRIFFIN detector provides new γ-γ coincidences to elucidate the excited state structure of ^{33}Al, and its capability to detect weak transitions has provided β-decay branching ratios for the ^{33}Mg$\rightarrow$ ^{33}Al$\rightarrow$ ^{33}Si decay chain.

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