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# Beta Decay of 80,82-Ga with GRIFFIN and Shape Coexistence in 80,82-Ge

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Shape coexistence in atomic nuclei, the existence of structures with different degrees of deformation in a very narrow energy range, is an exciting phenomenon that is present across the nuclidic chart. A recent theoretical study[1] using large scale shell model calculations predicted a well deformed prolate band at a low excitation energy in the doubly magic $^{78}$Ni nucleus which indicated the presence of shape coexistence very far from stability. At the same time, another experiment[2] observed an intruder $0_2{}^+$ state in $^{80}$Ge and interpreted this as evidence of shape coexistence. In our $\beta$-decay experiment, we aim to perform comprehensive spectroscopy of the $^{80}$Ge and $^{82}$Ge nuclei and investigate the evolution of their respective intruder excited $0_2{}^+$ states.

An experiment to search for shape coexistence in $^{80}$Ge and $^{82}$Ge has been performed at the ISAC-TRIUMF facility. The $^{80}$Ge and $^{82}$Ge isotopes were formed from the $\beta$-decay of their parent isotopes, $^{80}$Ga and $^{82}$Ga respectively. The $^{80}$Ga and $^{82}$Ga beams were produced by the ISOL technique using a 500 MeV proton beam with a 10 $\mu$A current colliding with a $UC_x$ target. A specialized ion source was used to suppress Rb contamination. The $\beta$-decay was measured using the GRIFFIN spectrometer which was equipped with 15 HPGe detectors for gamma ray detection, plastic scintillators for $\beta$-$\gamma$ tagging, the PACES array which has 5 Si(Li) detectors for conversion electron spectroscopy and 8 $LaBr_3$ scintillators for fast timing measurements of nuclear levels. Using this versatile array, correlated $\gamma$-$\gamma$, $\gamma$-electron and electron-electron data have been acquired simultaneously, providing a highly detailed level scheme for $^{80}$Ge. The preliminary results of this data analysis will be presented. \newline

[1] F. Nowacki, A. Poves, E. Caurier and B. Bounthong, PRL 117 272501 (2016).
[2] A. Gottardo et al., PRL 116, 182501 (2016).

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