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Structure of ^{188}Hg From Gamma-ray Spectroscopy With GRIFFIN

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Neutron deficient nuclei near Z=82 exhibit one of the most extensive manifestations of shape coexistence across nuclear chart [1]. In the even-even mercury isotopes, $^{182-188}$Hg, Coulomb excitation experiments have provided a sensitive probe to determine the E2 matrix elements, giving information on the nature of the deformation for nuclear states [2]. Precise measurements of absolute and relative B(E2) values for transitions between the shape-coexisting states also provide important information on their mixing [2,3].

For $\Delta J \neq 2$ transitions between states of the same parity, the determination of $B(E2; J_i \rightarrow J_f)$ values depends on the $E2/M1$ mixing ratios, δ. Precise measurements of these mixing ratios, however, are often challenging. One of the best methods to extract the mixing ratios is through $\gamma - \gamma$ angular correlation measurements following EC/β decay where a very high sensitivity can be achieved. We have recently adopted this technique for the GRIFFIN γ-ray spectrometer, located at the ISAC facility at TRIUMF, and have applied it to measurements of the EC/β decay of $^{188-200m}$Tl to $^{188-200}$Hg. Also Included in this measurement was the PACES array, used for the detection of conversion electrons to determine E0 transition strengths.

Our first results, for ^{188}Hg indicate the dominance of the $E2$ components in the $J \rightarrow J$ transitions. In addition to enabling the determination of the $B(E2)$ values, knowledge of these mixing ratios are also critical for the extraction of $E0$ components which may be enhanced if there are significant mixings between the shape-coexisting configurations. Results on angular correlation measurements and $E0$ transition strengths for ^{188}Hg will be presented.

[1] K. Heyde, J. L. Wood, Rev. Mod. Phys. 83, 1467(2011).
[2] N. Bree et al. Phys. Rev. L 112, 162701(2014).
[3] L. Gaffney et al., Phys. Rev. C 89, 024307 (2014).

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