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## Low-lying states of $^{164}\text{Hf}$ and the systematics of $N=92$ isotones

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The low spin states of  $^{164}\text{Hf}$  were populated using the in-beam  $^{148}\text{Sm}(^{20}\text{Ne},4n)^{164}\text{Hf}$  reaction at the iThemba LABS AFRODITE facility. The data analysis revealed a new gamma band,  $2_2^+$ , situated 0.8 MeV above the ground band. Measurements of spins and parities through the angular distribution ratios (DCO) and polarization confirms the placement of the new gamma band. Several other transitions have been tentatively observed and added to the level structure of  $^{164}\text{Hf}$ .

The half-lives of both previously and newly observed gamma-ray transitions were measured and found to be consistent with previously reported values.

The potential energy surface (PES) calculations indicate that the ground state of  $^{164}\text{Hf}$  is deformed, with parameters  $\beta > 0.27$  and  $\gamma > 18.9$ . The gamma band exhibits  $\beta > 0.30$  and  $\gamma > 24.3$ , while the energy of the second  $0^+$  state,  $E(0_2^+)$ , is relatively high at  $E = 0.9$  MeV, with deformation  $\beta > 0.39$  and  $\gamma > 14.1$ , making it impossible to identify the beta band. In this presentation, the nuclear systematics will also be discussed to validate the current observation in  $^{164}\text{Hf}$ .

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