

FIRST OBSERVATION OF HIGH SPIN STATES IN  $^{166}\text{Ta}^*$ 

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The signature inversion in doubly odd nuclei is a striking phenomenon in the  $N \sim 90$  nuclear region (e.g., see Ref.1). To test the theoretical models<sup>2)</sup>, measurement of  $^{164}\text{Lu}$  ( $Z=71, N=93$ ) was performed<sup>3)</sup>, and the measurement of  $^{166}\text{Ta}$  ( $Z=73, N=93$ ) is a subsequent study of this problem.

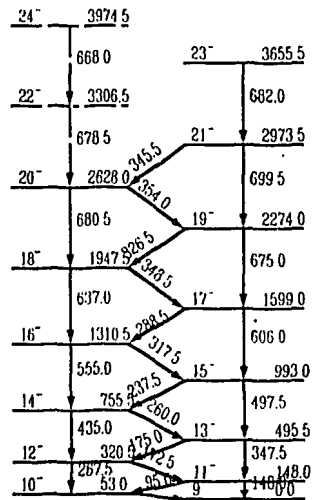
In the present work, the experiment was done using the  $^{141}\text{Pr}(^{28}\text{Si},3n)^{166}\text{Ta}$  reaction at 127MeV. The HI-13 tandem accelerator provided the  $^{28}\text{Si}$  beam. The target consisted three stacked  $500\mu\text{g}/\text{cm}^2$  foils of  $^{141}\text{Pr}$  that was enriched to 98%.  $\gamma\text{-}\gamma$  coincidences were measured by using 6 Compton Suppressed HPGe detectors and a HPGe planner.  $4 \times 10^7$  two-foil coincident events were obtained. Since there was no high spin state data of  $^{166}\text{Ta}$  published before, the measurement of excitation function of  $^{28}\text{Si} + ^{141}\text{Pr}$  with the beam energy from 123MeV to 131MeV was also carried out.

A strongly coupling band shown in the figure is identified as the yrast band of  $^{166}\text{Ta}$  via excitation function and  $\gamma\text{-}\gamma$  coincident experiments. Spin assignment of the levels is according to systematic analysis and the measurement of DCO ratio. The structure of  $^{166}\text{Ta}$  yrast band shows an expected larger amplitude of M1 transition zigzag behavior before signature inversion and a desired larger angular momentum (rotational frequency) of the signature inversion point compared with  $^{164}\text{Lu}$ . More detail study of the experimental data is in processing.

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## Reference

- 1) R. Bengtsson et al. Nucl. Phys. A415 (1984) 189
- 2) K.Hara and Y.Sun Nucl. Phys. A531 (1991) 221
- 3) Y.-Z.Liu et al. to be published



proposed level structure of  $^{166}\text{Ta}$  yrast band