

Abstract Submitted
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Nucleon Alignment and Shape Competition at High Spin in

¹⁸⁰Hf¹ U.S. TANDEL, P. CHOWDHURY, S.K. TANDEL, S. SHEPPARD, U. Massachusetts Lowell, D. CLINE, C.Y. WU, U. Rochester, M.P. CARPENTER, R.V.F. JANSSENS, T.L. KHOO, T. LAURITSEN, C.J. LISTER, D. SEWERYNIAK, S. ZHU, Argonne Natl. Lab. — In light even-N Hf isotopes (N = 96-106), the first $i_{13/2}$ neutron alignment occurs at $h\omega < 0.3$ MeV. In contrast, no alignment was observed up to ~ 0.4 MeV in ^{180,182}Hf (N = 108,110) [1]. Theoretical calculations predict that oblate collective rotation becomes yrast at high spins in ¹⁸⁰Hf [2, 3]. In the present work, the yrast band of ¹⁸⁰Hf has been extended to high spins, via inelastic excitation, using a 1300 MeV ¹⁸⁰Hf beam incident on a thin ²³²Th target. The γ rays were detected by Gammasphere, with event by event Doppler correction and Q-value selectivity provided by CHICO. The data reveal onset of the first nucleon alignment in ¹⁸⁰Hf at $h\omega \sim 0.43$ MeV, which is significantly higher than predictions (~ 0.35 MeV). Interestingly, the γ -vibrational band is crossed by a band with apparent high moment-of-inertia at ~ 0.25 MeV. This structure, which becomes near yrast at the highest observed spins will be discussed in the context of nucleon alignment and shape competition at high spin in ¹⁸⁰Hf. [1] E. Ngijoi-Yogo, Ph.D. thesis, U.Mass. Lowell (2004) [2] R.R. Hilton and H.J. Mang, Phys. Rev. Lett. 43, 1979 (1979). [3] F.R. Xu et al., Phys. Rev. C62, 014301 (2000).

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