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Single particle state coupled to the second 0+ state in 97Zr

The sudden onset of the deformation has been well known around 100Zn. This phenomenon is called as the quantum phase transition. In the theoretical calculations with the shell model framework, the deformation starts in the second 0+ state at 96Zr. We studied the inelastic decay to the scond 0+ state from the isobaric analog resonances of 97Zr by proton scattering on 96Zr at Kyushu University. The clear resonances have been observed in the exciation function of the inelastic channel. In addition, the angular distribution of the protons indicate the spin of 5/2+, which is different from the spin of the ground state.
This is the direct evidence of the deformation of the second state.

Primary authors: IMAI, Nobu (CNS); TSUNODA, Rieko; DOZONO, Masanori (Center for Nuclear Study, the University of Tokyo); KITAMURA, Noritaka; MICHIMASA, Shin'ichiro (Center for Nuclear Study, the Univ. of Tokyo); SHIMIZU, Noritaka (Center for Nuclear Study, the University of Tokyo)

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