

Search for neutron decoupling in ^{22}O

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We have searched for valence neutron decoupling in ^{22}O , a phenomenon recently observed in neutron rich C [1-3], B [4-6] and lighter O [7,8] nuclei. The experiment [9] has been carried out at the RIKEN projectile fragment separator (RIPS), where a secondary ^{22}O beam with an intensity of 600 cps was provided.

From the cross section of the $(d,d'\gamma)$ reaction for the transition between the ground state and the first 2^+ state of ^{22}O , the neutron and proton deformation parameters have been deduced by distorted wave analysis using and reanalyzing the data of a previous Coulomb excitation measurement [10]. The ratio of the neutron and proton multipole transition matrix elements M_n/M_p has been derived to be around 1. This reflects that ^{22}O isotope has a small and similar neutron and proton deformations, which is consistent with $N=14$ shell closure. Thus, the concept of the neutron decoupling does not hold for this nucleus.

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