MAGIC PROPERTIES OF THE NEUTRON-RICH OXYGEN AND CARBON ISOTOPES*

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Experiments at the NSCL [1] and GANIL [2,3] have revealed properties of excited states in the oxygen isotopes out to neutron-drip line that are in excellent agreement with those predicted by the empirical USD hamiltonian in the sd-shell [4]. It is found that both ^{22}O and ^{24}O show properties of being doubly magic, and the spectrum of ^{22}O can be interpreted in terms of pure neutron particle-hole states. ^{24}O is also unique in being a well-bound (by about 4 MeV) doubly-magic nucleus on the neutron-drip line with no bound excited states. The properties obtained with the USD interaction are significantly different than those obtained with the renormalized G matrix - possible reasons for this difference will be discussed. In addition, new information on the spectra of neutron-rich carbon isotopes [3] shows that the magic neutron numbers change rapidly with Z and that the effective neutron-neutron interaction is strongly influenced by the smaller binding energies for the neutrons in carbon compared to those in oxygen. I will also discuss the spectroscopic factors for knock-out reactions [5], and Hartree-Fock calculations for the densities and interaction cross sections [6]. ^{22}C is predicted to have unique halo features.

* This work is supported by the NSF grant PHY-0244453

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