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# Ab initio study of Z(N)=6 magicity

The existence of magic numbers of protons and neutrons in nuclei is essential for understanding the nuclear structure and fundamental nuclear forces. Over decades, researchers have conducted theoretical and experimental studies on a new magic number, *Z(N)=6*, focusing on observables such as radii, binding energy, electromagnetic transition, and nucleon separation energies. We performed ab initio no-core shell model (NCSM) calculations with Daejeon16 *NN* interaction for the occupation numbers of the lowest single particle states in the ground states of *Z(N)=6* and *Z(N)=8* isotopes (isotones). We compared the 0p_(1/2) occupancies in *Z(N)=6* nuclei with those of 0d_(5/2) in the nuclei with the well-established magic numbers $Z = 8$ and $N = 8$. The results of our calculations do not support *Z(N)=6* as a magic number over a range of atomic numbers. However, 14C and 14O exhibit the characteristics of double-magic nuclei.

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