

Two-neutron halo of drip-line nuclei from the low-energy limit of neutron-neutron interaction

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The formation of two-neutron halo is described using the neutron-neutron (nn) interaction fixed at the low-energy nn scattering limit [1]. This method is tested for loosely-bound two neutrons in ^{24}O , where a good agreement with experimental data is found. It is applied to halo neutrons in ^{22}C in two ways: with the ^{20}C core being closed or correlated due to excitations from the closed core. This nn interaction is shown to be strong enough to produce a two-neutron halo in both cases, locating ^{22}C on the drip line, while ^{21}C remains unbound. A unique relation between the two neutron separation energy, S_{2n} and the radius of neutron halo is presented. New predictions for S_{2n} and the radius of neutron halo are given for ^{22}C . The appearance of Efimov states is also discussed. Spectra of excited states in ^{22}C are predicted.

[1] T. Suzuki, T. Otsuka, C. Yuan and N. Alahari, Phys. Lett. B 753, 199 (2016).

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