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Evolution of Efimov states in 2-neutron halo nuclei – a general study INDRANIL MAZUMDAR, Triangle Universities Nuclear Laboratory, Duke University, Durham NC 27708 -0708, VIDYASAGAR BHASIN, Department of Physics & Astrophysics, University of Delhi, Delhi, India, A.R.P. RAU, Department of Physics & Astronomy, Louisiana State University, Baton Rouge — The discovery of neutron-rich halo nuclei near the drip line has opened up new vistas in contemporary nuclear physics. The structural properties of 2-neutron halo nuclei provide the opportunity to search for the elusive Efimov effect in nuclear physics. We present results of our detailed calculations to search for Efimov states and their evolutions with increasing two-body (neutron-core) interaction in 2-neutron halo nuclei. Working within the framework of a three-body model with realistic finite range two-body interactions we investigate the nuclear three-body system of two halo neutrons very weakly coupled to a heavy core, to investigate necessary conditions for the occurrence of Efimov states. Extending the analysis to the scattering sector, we find that these states evolve into Feshbach type resonances. This behavior is very similar to the 20C nucleus in which the occurrence of Efimov states evolving into resonances in the elastic scattering of n–19C system has been investigated in recent publications. This work, thereby, extends the study of the Efimov effect beyond 20C, showing that 32Ne and 38Mg exhibit a very similar dynamical structure. These nuclei are, therefore, also candidates for probing experimentally the Efimov effect.

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