

Abstract Submitted  
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**Geometric analysis of three-body nuclei using Efimov physics<sup>1</sup>**

AUDREY FARRELL, Stony Brook University, ALDO BONASERA, Texas AM University Cyclotron Institute, HUA ZHENG, Shaanxi Normal University — The Thomas theorem describes loosely bound two-body quantum systems that become strongly bound as three-body systems, with a series of excited levels known as Efimov states. Using hyper-spherical geometries to describe two- and three-particle nuclei, we performed fits of total energy to known binding energies in order to determine the weighting of short-range potentials in a given interaction. When applying the appropriate scattering lengths and ranges to the system, we were able to replicate the binding energies of these nuclei with few fitted parameters. With this method, we tested various models for different light nuclei and compared which geometries reproduced the binding energy most accurately. Once we had performed enough fits to have estimates of the two-body potentials for systems of neutrons and protons, we extended our model by treating these systems as point particles in order to reproduce binding energies for heavier isotopes. Using this method we can make predictions of which experimentally measured binding energies correspond to Thomas and Efimov states.

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