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Ab initio theories for light nuclei and neutron stars¹

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In this talk I will touch upon several features of modern ab initio low-energy nuclear theory. I will start by discussing what "ab initio" means in this context. Specifically, I will spend some time going over nucleon-nucleon and three-nucleon interactions and their connections with the underlying theory of Quantum Chromodynamics. I will then show how these interactions are used to describe light nuclei using essentially exact few-body methods. I will then discuss heavier systems, especially those of astrophysical relevance, as well as the methods used to tackle them.

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