

Abstract Submitted
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***Ab initio* calculations of low-energy nuclear scattering using a Lüscher-like method**¹ XILIN ZHANG, Ohio State Univ - Columbus — *Ab initio* nuclear structure calculations that compute nuclear static properties based on underlying nucleon interactions have now progressed to studying medium-mass nuclei. However, first-principle calculations for nuclear scattering and reactions are still limited to light systems. A method suitable for heavier nuclei would be very valuable in studying scattering and reactions with astrophysical relevance and for the success of the coming FRIB program that will focus on unstable nuclei near drip lines. In this talk, I will present my recent development of such a method. It modifies the so-called Lüscher method, used in Lattice QCD for computing hadronic scattering, to compute nuclear scattering. The key idea is a computational experiment: realizing the trapping of nucleus-nucleus or nucleus-nucleon systems in harmonic potential well within the *ab initio* structure calculations, and then extracting scattering information from the computed discrete energy levels. I will discuss the formalism and report encouraging results from my collaboration with *ab initio* groups on computing neutron–alpha and neutron–Oxygen-24 scattering phase shifts. I will end with a brief discussions on future developments.

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