Abstract Submitted
for the DNP15 Meeting of
The American Physical Society

Halo Effective Field Theory of 6He ARBIN THAPALIYA, Ohio University, CHEN JI, TRIUMF, DANIEL PHILLIPS, Ohio University — Halo nuclei exhibit separation of scales and are therefore amenable to an Effective Field Theory (EFT) description. In Halo EFT, ^{6}He can be thought of as a tight ^{4}He (α) core surrounded by two loosely bound neutrons (n), hence it constitutes an effective Borromean three-body system. The valence neutrons of ^{6}He interact with the α-core predominantly through a p-wave ($^2P_{3/2}$) resonance while the two neutrons are in the relative resonant $^1S_0$ partial wave. The leading order (LO) Halo EFT calculations using momentum-space Faddeev equations pertinent to such a treatment of bound ^{6}He were carried out by Ji et al. in Phys. Rev. C **90**, 044004 (2014). As an extension to that work, we are investigating ^{6}He up to NLO within Halo EFT. In this talk, I will demonstrate how the NLO piece of the $^1S_0$ nn dimer propagator, the NLO piece of the $^2P_{3/2}$ $n\alpha$ dimer propagator and the contact $n\alpha$ vertex in the $^2S_{1/2}$ channel enter the NLO amplitude for the $nn\alpha$ system. I will discuss the divergences and renormalization at this order and show results for the Faddeev components.

Arbin Thapaliya
Ohio University

Date submitted: 08 Jun 2015 Electronic form version 1.4