

Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

Weakly bound tetra-atomic molecules: attaching neutral atoms to Efimov states¹ YUJUN WANG, B.D. ESRY, Dept. of Physics, Kansas State University — We discuss the conditions under which a neutral atom can be attached to an Efimov state to form a tetra-atomic molecule. We use the adiabatic hyperspherical representation and obtain the the four-body adiabatic hyperspherical potentials by treating the interactions between the atoms in the Efimov state and the fourth atom perturbatively via a Fermi contact potential with an energy-dependent scattering length. These adiabatic potentials are then used to determine the binding energies of the tetra-atomic molecules which, in turn, allow us to determine the combinations of scattering length and effective range that result in binding. These molecules are expected to have long lifetimes and sizes comparable to the Efimov molecules themselves. We will also discuss the atom-Efimov state scattering length and speculate about collisionally induced quenching of the Efimov states. These results — the latter in particular — address the increasingly relevant and interesting question of the behavior of Efimov states in ultracold quantum gases.

¹Supported by the National Science Foundation.

Yujun Wang
Dept. of Physics, Kansas State University

Date submitted: 02 Feb 2007

Electronic form version 1.4