NWS11-2011-000043

Abstract for an Invited Paper
for the NWS11 Meeting of
the American Physical Society

Towards ultracold RbCa molecules[1]

MICHAELA KLEINERT, Willamette University

Ultracold heteronuclear molecules have received much attention lately because of their potential applications in high-precision spectroscopy, studies of fundamental symmetries and quantum information processing. So far the focus has been on alkaline/alkaline dimers since their constituent atoms have been studied extensively. Recently, several groups have begun work on more challenging alkaline/alkaline-earth or alkaline/rare-earth combinations. In addition to a permanent electric dipole moment, which makes the alkaline/alkaline dimers such an intriguing system, alkaline/alkaline-earth molecules also possess a permanent magnetic dipole moment, thus allowing the manipulation with electric and magnetic fields. In addition, the molecular ground state of an alkaline/alkaline-earth dimer has a non-vanishing spin. Interesting collision dynamics, for example the suppression of collisions in carefully tailored external fields, have been predicted. At Willamette University, we will trap ultracold gases of rubidium and calcium together to form the molecular dimer RbCa via photoassociation of the constituent atoms. In this talk we will discuss the current state of the experiment and our future plans.

In collaboration with Hayley Whitson, Garrett Potter, and Kristen Norton, Willamette University.

[1]We are grateful for support from the M. J. Murdock Charitable Trust, Willamette University, and the National Science Foundation.