

Abstract Submitted
for the SES16 Meeting of
The American Physical Society

Broadband laser excitation of van der Waals polymers in a cold atomic gas.¹ JIANING HAN, University of South Alabama — Van der Waals interactions are generally studied in physics, chemistry, biology, and other fields of science. Stable van der Waals Rydberg molecular states, all the atoms in the molecule are in excited states, have been studied. In this article, we study the molecular states excited from a broadband laser or few-photon excitations. It is shown that more molecular states are observed. In other words, broadband laser excitation will create more molecular states than a narrow band laser excitation, or the dipole-blockaded case. Dipole-blockade is promising for quantum information and has been studied intensively. Dipole-blockade can be avoided by a broadband laser excitation. In this article, three-body and four-body dipole blockade caused by van der Waals interactions will be investigated. The results can be used to test the feasibility of ultracold atoms as an alternative energy source.

¹DOE Implementation Award

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Date submitted: 04 Oct 2016

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