

Abstract Submitted  
for the DAMOP17 Meeting of  
The American Physical Society

**Efimov-van-der-Waals universality for ultracold atoms with positive scattering lengths**<sup>1</sup> JOSE D'INCAO, JILA, Dept. of Physics, Univ of Colorado, Boulder and NIST, PAUL MESTROM, Eindhoven University of Technology, JIA WANG, Centre for Quantum and Optical Science, Swinburne University of Technology, CHRIS GREENE, Department of Physics and Astronomy, Purdue University — We study the universality of the three-body parameters for systems relevant for ultracold quantum gases with positive  $s$ -wave two-body scattering lengths. Our results account for finite-range van-der-Waals effects and their universality is tested by changing the number of deeply bound diatomic states supported by our interaction model. We find that the physics controlling the values of the three-body parameters associated with the ground and excited Efimov states is constrained by a variational principle and can be strongly affected by  $d$ -wave interactions that prevent both trimer states from merging into the atom-dimer continuum. Our results enable comparisons to current experimental data and suggest tests of universality for atomic systems with positive scattering lengths.

<sup>1</sup>This work was supported by the U. S. National Science Foundation.

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Date submitted: 27 Jan 2017

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