Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Efimov correlations in strongly interacting Bose gases JOHANNES HOFMANN, University of Cambridge, MARCUS BARTH, Technische Universitaet Muenchen — A series of recent hallmark experiments have demonstrated that Bose gases can be created in the strongly interacting unitary limit in the non-degenerate high-temperature regime. These systems display the three-body Efimov effect, which poses a theoretical challenge to compute observables including these relevant three-body correlations. In this talk, I shall present our results for the virial coefficients, the contact parameters, and the momentum distribution of a strongly interacting three-dimensional Bose gas obtained by means of a virial expansion up to third order in the fugacity, which takes into account three-body correlations exactly. Our results characterize the non-degenerate regime of the interacting Bose gas, where the thermal wavelength is smaller than the interparticle spacing but the scattering length may be arbitrarily large. In addition, we provide a calculation of the momentum distribution at unitarity, which displays a universal high-momentum tail with a log-periodic momentum dependence - a direct signature of Efimov physics. In particular, we provide a quantitative description of the momentum distribution at high momentum as measured by the JILA group [Makotyn et al., Nat. Phys. 10, 116 (2014)]. Our results allow the spectroscopy of Efimov states at unitarity.

Johannes Hofmann
University of Cambridge

Date submitted: 06 Nov 2015 Electronic form version 1.4