DAMOP14-2014-000505

Abstract for an Invited Paper
for the DAMOP14 Meeting of
the American Physical Society

From unitary to uniform Bose gases

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In this talk I will give an overview of our recent experiments on Bose gases in extreme interaction regimes. In one limit, we studied the stability of a unitary Bose gas, with strongest possible interactions allowed by quantum mechanics [1]. In the other limit, we studied purely quantum-statistical ideal-gas phenomena, such as the quantum Joule-Thomson effect [2], by achieving Bose-Einstein condensation in a quasi-uniform potential of an optical-box trap [3].

[1] Stability of a Unitary Bose Gas, R. J. Fletcher, A. L. Gaunt, N. Navon, R. P. Smith and Z. Hadzibabic, Phys. Rev. Lett. 111, 125303 (2013).
[2] Quantum Joule-Thomson Effect in a Saturated Homogeneous Bose Gas, T. F. Schmidutz, I. Gotlibovych, A. L. Gaunt, R. P. Smith, N. Navon, and Z. Hadzibabic, Phys. Rev. Lett. 112, 040403 (2014).
[3] Bose-Einstein Condensation of Atoms in a Uniform Potential, A. L. Gaunt, T. F. Schmidutz, I. Gotlibovych, R. P. Smith, and Z. Hadzibabic, Phys. Rev. Lett. 110, 200406 (2013).