Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Dilute Bose gases with large scattering length using Bijl-Jastrow wavefunctions ANDREW SYKES, JOHN CORSON, MICHELLE SZE, JOHN BOHN, JILA, UC Boulder — The Bijl-Jastrow wavefunction, which explicitly includes two-body correlations, has been reasonably successful in explaining macroscopic properties of liquid Helium at low temperatures. We apply the same techniques to understand dilute Bose gases with an effective zero-range interaction (employing the Bethe-Peierls boundary condition rather than including an explicit two-body potential). We discuss the renormalisation issues which arise as a result of this diverging zero-range boundary condition. We calculate observables such as the ground state energy, the condensate fraction, and Tan's contact in the system, with particularly interest in the regime where the gas parameter na^3 is appreciable (n being the number density and a the scattering length). Finally, we will discuss possible extensions and avenues for further research.

Andrew Sykes
JILA, UC Boulder

Date submitted: 30 Jan 2014 Electronic form version 1.4