



# 清华大学高等研究院

Institute for Advanced Study, Tsinghua University

## 学术报告

**Title:** Stability and Anomalous Compressibility of Resonant Bose Gases

**Speaker:** Shaojian JIANG  
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**Time:** 10:30am, Friday, May 22, 2015

**Venue:** Conference Hall 322, Science Building, Tsinghua University

### Abstract

The stability of Bose gases near resonance has been a puzzling problem. Recently, an instability was predicted for Bose gases at a positive scattering length at zero temperature, which is dictated by the running of the coupling constant. At finite temperatures, we demonstrate that, in addition to generating thermal pressure, thermal atoms enhance the repulsiveness of the scale-dependent interactions between condensed atoms due to a renormalization effect and further stabilize the Bose gases. Consequently, we find that, as a precursor of instability, the compressibility develops an anomalous structure as a function of scattering length and is drastically reduced compared with the mean-field value. Furthermore, the density profile of a Bose gas in a harmonic trap is found to develop a flat top near the center. This is due to the anomalous behavior of compressibility and can be a potential smoking gun for probing such an effect.