



清华大学  
Tsinghua University



## 清华大学高等研究院 - 冷原子物理系列讲座

# Some Few-Body Problems for Ultracold Atoms

**地点:** 高等研究院, 科学馆三楼322报告厅

**报告人:** Professor Shina Tan  
Georgia Institute of Technology

When atoms are cooled to sufficiently low temperatures, their de Broglie wave lengths become much larger than the characteristic ranges of the van de Waals forces. For these ultracold atoms one can often use a simplified model, in which the atoms have contact interactions. Short-range details of the interactions become irrelevant to low energy physics. Instead, only some effective parameters, such as the s-wave scattering length, are relevant. It may not even matter very much whether the particles are atoms or other kinds of particles, such as low energy nucleons. Hence the physics of ultracold atoms is also related to other areas such as nuclear physics. In this lecture series, Shina Tan will discuss some quantum few-body problems for cold atoms with short range interactions (using blackboard).

<p><b>Lecture 1</b> July 21 (Mon) 2014 10:30-12:00</p> <p>Two-body problem in one dimension</p>	<p><b>Lecture 2</b> July 21 (Mon) 2014 2:30-4:00</p> <p>Two-body problem in two dimensions</p>	<p><b>Lecture 3</b> July 23 (Wed) 2014 10:30-12:00</p> <p>Two-body problem in three dimensions</p>	<p><b>Lecture 4</b> July 23 (Wed) 2014 2:30-4:00</p> <p>Effective interaction of two particles in a wave guide</p>
<p><b>Lecture 5</b> July 25 (Fri) 2014 10:30-12:00</p> <p>Estimating three-body recombination rates on the back of an envelope</p>	<p><b>Lecture 6</b> July 25 (Fri) 2014 2:30-4:00</p> <p>Efimov effect</p>	<p><b>Lecture 7</b> July 28 (Mon) 2014 10:30-12:00</p> <p>Three or Four fermions with large scattering length</p>	
<p><b>Lecture 8</b> July 28 (Mon) 2014 2:30-4:00</p> <p>Efimov effect in mixed dimensions</p>	<p><b>Lecture 9</b> July 30 (Wed) 2014 10:30-12:00</p> <p>Two atoms with large scattering length near a Neumann mirror</p>	<p><b>Lecture 10</b> July 30 (Wed) 2014 2:30-4:00</p> <p>Low energy collision of three bosons with short-range interactions</p>	



### Professor Shina Tan

Shina Tan graduated from Tsinghua University. He received a Master's degree from the Institute of Theoretical Physics, Chinese Academy of Sciences, and a Doctor's degree from the University of Chicago. Afterwards he became a postdoctoral associate at the Institute for Nuclear Theory at the University of Washington, and then a Postdoctoral Prize Fellow at Yale University. Since 2010 he has been an assistant professor at the Georgia Institute of Technology. His research interests are in the theory of ultracold quantum gases. He received the American Physical Society George E. Valley, Jr. Prize in 2010, and a Sloan Fellowship in 2011.