

Special Seminar

Counting the Uncountable: Numerical Calculation of Granular Entropy



Daan Frenkel

University of Cambridge

Time: 10:00am, Oct. 21, 2016 (Friday)

时间: 2016年10月21日 上午10点 (周五)

Venue: w563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

In an attempt to construct a Statistical Mechanics of Powders, Sir Sam Edwards introduced the concept of “granular entropy”, defined as the logarithm of the number of distinct packings of N granular particles in a fixed volume V . In 1989, the proposal was rather controversial but much of the debate was sterile because the granular entropy could not even be computed for systems as small as 20 particles - hardly a good approximation of the thermodynamic limit. In my talk I will describe how granular entropies of much larger systems can now be computed, using a novel algorithm. Interestingly, it turns out the definition of granular entropy will have to be modified to guarantee that granular entropy is extensive. Which brings us back to the Gibbs paradox and a dirty secret of colloid science.

About the Speaker

Daan Frenkel was appointed to the 1968 Chair of Theoretical Chemistry at Cambridge (UK) in 2007. He is a Foreign Member of the Royal Society (London), Foreign Honorary Member of the American Academy of Arts & Sciences, Foreign Associate of the National Academy of Sciences (USA), member of the Royal Dutch Academy of Arts and Sciences and Honorary Fellow of Trinity College Cambridge. He has received many international prizes and honors, including the APS Rahman Prize and, most recently, the Boltzmann Medal. He received his PhD from the University of Amsterdam (NL) and has worked at UCLA, Shell, the FOM Institute AMOLF, and the Universities of Utrecht and Amsterdam.