数学与系统科学研究院

计算数学所学术报告

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报告题目：

Understanding force chains in dense granular materials

邀请人： 袁礼研究员

报告时间： 2009 年 6 月 22 日(周一)

下午 2:30—3:30

报告地点： 科技综合楼三层 311

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Abstract: Granular matter is a large assemblage of dense packing particles. Heterogeneous paths, referred to as force chains, may establish to transmit external forces along the contact network throughout a granular assembly, as illustrated in the figure. Force chains may instaneously response to perturbations of external forces, and act as the key factor that determines mechanical properties such as stability, elasticity and flowability. To understand the structure and transformation of contact network and force chains, it is necessary to analyze physical processes occurring within granular materials. We firstly analyzed three characteristic time scales and proposed three dimensionless numbers to measure their relative importance. By proposing three conditions defining a force chain, the chain length distribution in a static granular matter under uniaxial compressions was found in a form of power law. The exponent of 1.744 was surprisingly independent of packing fractions and static surface friction of particles. The lateral pressure ratio was calculated and was tentatively related to the

corresponding force chain architecture. The results obtained in this work indicated that interpretation to the structure of force chains would be a major work of granular physics in the future.

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