



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
SEMINAR

Jamming at High Densities

by

Professor Ning XU (徐寧教授)
Department of Physics,
University of Science and Technology of China

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ALL INTERESTED ARE WELCOME

Abstract

Colloids and granular materials jam into amorphous solids at sufficient high volume fractions. We extend studies of jammed solids to volume fractions much higher than the jamming transition threshold. At zero temperature and shear stress, the whole jamming regime is divided into two distinct parts which are separated by a crossover volume fraction ϕ_d . Deeply jammed solids at $\phi > \phi_d$ exhibit different critical scalings, structure, and vibrational properties from marginally jammed solids at $\phi < \phi_d$. Correspondingly, dynamical properties such as the glass transition temperature and dynamical heterogeneity show opposite volume fraction dependence on both sides of ϕ_d . Whether ϕ_d is indeed critical-like requires further studies.

Enquiries: 2609 6339