

# Università degli Studi di Trieste

## Dipartimento di Fisica

# Alumnorum Colloquia

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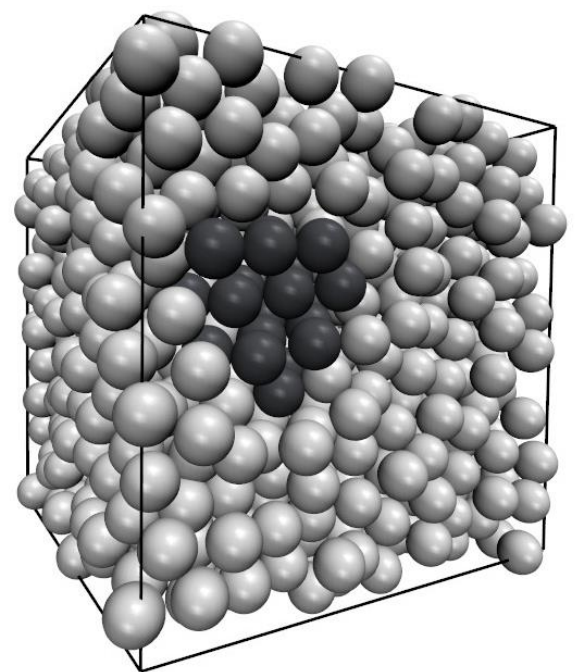
January 11, 4.30 PM - Lecture room A, F building, Physics Dept. - via Valerio, 2 – Trieste

## Disks, spheres and hyperspheres: from order to disorder in condensed matter



The competition between order and disorder in dense states of matter (liquids, crystals, glasses) is one of the most fascinating aspects of statistical physics. The microscopic mechanisms that allow us to transform some liquids into glass with ease, while others crystallize quickly when cooled or compressed, are subtle and still remain poorly understood. To try to understand how the collective behavior of these systems emerges from the interactions between the atoms, physicists often build on simple theoretical models, whose prototype is a system of purely repulsive hard spheres. These models, which were introduced during the second

half of the twentieth century, have recently found important applications in glass transition studies, soft matter modeling, as well as in packing problems. The generalization to different spatial dimensions - from the Euclidean plane to the infinite dimensional limit - brings additional insight into which microscopic features stabilize disordered phases of matter and into the interplay between structure and dynamics. In reviewing these recent advances, I will emphasize the crucial role of numerical simulations, which help interpreting the experiments and provide stringent tests of theoretical models. I will discuss how to exploit powerful yet cheap architectures, such as graphics cards, and efficient algorithms to dramatically accelerate the sampling of configurational space.



Organizzazione a cura di: M. Girardi, E. Gozzi, G. Pastore, R. Rui, E. Vesselli

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**Everyone interested in the topic is welcome to attend**

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