

abstract

MEMBERS SEMINAR

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

The "hard discs" model of matter has been studied intensely in statistical mechanics and theoretical chemistry for decades. From computer simulations it appears that there is a solid-liquid phase transition once the relative area of the discs is about 0.71, but little seems known mathematically. Indeed, Gian-Carlo Rota suggested that if we knew the total measure of the underlying configuration space, "we would know, for example, why water boils at 100 degrees on the basis of purely atomic calculations."

Persi Diaconis pointed out that the space of all possible configurations of n discs of radius r in a unit box is also endowed with a natural topology, and suggests several interesting questions. For a fixed n , how small must r be for the configuration space to be connected? How large can the Betti numbers be? I will discuss recent progress on this and related problems.