Estimates on the Boltzmann collision kernel via analysis of a many particle stochastic model

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Abstract

Kinetic theory describes the evolution of dilute gas of particles interacting through binary collisions. The equations of kinetic theory are non-linear evolution equations for a probability density. In 1956, Mark Kac proposed a strategy for investigating such equations via a direct analysis of a stochastic model, different from, and simpler than, the underlying physical collision model, but still leading to the same equations. There has been much recent progress in recent years on determining the rate of equilibriation in this model, though until now, this had only had been made only Maxwellian molecules, or, in a singular result of Villani, for super-hard collisions. Recent work of myself, Carvalho and Loss extends this progress to the physically significant hard-sphere case, as will be explained in this lecture.