

Abstract Submitted
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Second-order transport due to fluctuations in clustering particle systems MADHUSUDAN PAI¹, SHANKAR SUBRAMANIAM, Iowa State University — Particle systems that exhibit clustering are characterized by fluctuations in particle number. We perform molecular dynamics simulations of a freely-cooling granular gas using a hard-sphere event-driven algorithm in order to investigate clustering. We show that the mean number density in the freely-cooling gas remains uniform deep into the clustering regime, although the system exhibits significant clustering in each realization. We further show that fluctuations in particle number are correctly characterized by the second-order density. An important quantity that governs the evolution of the second-order density is the relative velocity between particle pairs. A simple scaling behavior of the relative velocity with restitution coefficient is shown to hold. This second-order analysis can be extended to study clustering in other particle systems, such as nanoparticle aggregation.

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