Diffusion of impurities in a moderately dense confined granular gas

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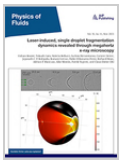

Diffusion of particles in a confined gas

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What is it about?

We study mass transport of impurities in a nonequilibrium model that mimics a quasi-2D granular gas, the so called Delta model. Diffusion coefficients are derived via the Chapman–Enskog method and validated with simulations. Applications include segregation driven by thermal gradients and gravity. There is also an important part of computer simulation that verifies the validity of the theoretical calculations.

Why is it important?

Our research shows how one can calculate the diffusion coefficient in a nonequilibrium model. The model dissipates energy and it is restored by a special injection mechanism, so called Delta-Model. Moreover, it is analyzed how this model becomes inhomogeneous by segregation of particles with distinct mechanical properties.

Perspectives

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This articles shows another example of how complicated Chapman-Enskog method allows us to calculate transport coefficients, in particular the Diffusion coefficient.
Computer simulations discovered a new regime that may trigger research to explain such new phenomena.

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