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Anomalous effects in granular Poiseuille flow: temperature bimodality and Knudsen minima DEEPTHI SHIVANNA, MEHEBOOB ALAM, Jawaharlal Nehru Centre for Advanced Scientific Research — Two well-known rarefaction effects, the *Knudsen minima* and the *bimodality* of the temperature profile, are investigated in the granular analog of the Poiseuille flow via event-driven simulations of smooth inelastic hard-disks under gravity. The appearance of the bimodal-shape of the granular temperature is found to depend crucially on wall conditions: the bimodality is most prominent for the intermediate case between the specular and the bounce-back wall-particle collisions. The dependences of the height of the temperature maxima and its location (from the center of the channel) on the restitution coefficient are in variance with the related kinetic theory predictions (Tij & Santos, J. Stat. Phys. 2004). For the Poiseuille flow of a rarefied gas, it is known that the mass flow rate decreases with increasing Knudsen number (Kn), reaches a minimum at $Kn \sim O(1)$ and increases again with further increase in Kn– this is dubbed *Knusden minima*. In a granular Poiseuille flow we show that this Knudsen minima is absent. The origin of these anomalous behaviour is shown to be tied to dissipation-induced particle-clustering in the channel.

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