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Anatomy of a Jam¹ JUNYAO TANG², SEPEHR SAGDIGHPOUR³, ROBERT BEHRINGER⁴, Department of Physics, Duke University — Flow in a hopper is both a fertile testing ground for understanding models for granular flow and industrially highly relevant. However, the formation of arches in the hopper opening, which halts the hopper flow unpredictably, is still poorly understood. In this work, we conduct a two-dimension hopper experiments, using photoelastic particles, and characterize these experiments in terms of a statistical model that considers the probability of jamming. The distribution of the hopper flow times exhibits an exponential decay, which shows the existence of a characteristic “mean flow time.” We then conduct further experiments to examine the connection between the mean flow time, the hopper geometry, the local density, and geometric structures and forces at the particle scale.

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