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Anomalous velocity distributions in a model for active Brownian suspensions[1] BENJAMIN VOLLMAYR-LEE, Bucknell University, ANDREA FIEGE, ANNETTE ZIPPELIUS, University of Göttingen — Large scale simulations and analytical theory have been combined to obtain the non-equilibrium velocity distribution, $f(v)$, of randomly accelerated particles in suspension. The simulations are based on an event-driven algorithm, generalised to include friction. They reveal strongly anomalous but largely universal distributions which are independent of volume fraction and collision processes, which suggests a one-particle model should capture all the essential features. We have formulated this one-particle model and solved it analytically in the limit of strong damping, where we find that $f(v)$ decays as $1/v$ for multiple decades, eventually crossing over to a Gaussian decay for the largest velocities. Many particle simulations and numerical solution of the one-particle model agree for all values of the damping.

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