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Dynamics of spheroid particles in channel flow WENBIN MAO, ALEXANDER ALEXEEV, Georgia Institute of Technology, Atlanta, GA, 30332, USA — The effect of inertia on the dynamics of rigid spheroid microparticles in a pressure-driven channel flow is studied using a hybrid lattice Boltzmann and lattice spring method. We find distinctive behaviors of particles depending on the particle shape, initial orientation, and ratio of particle size to the channel size. Two possible stable modes of motion are found for prolate spheroids. Particles either tumble in a shear plane or spin with the axis parallel to the vortex direction. We present a phase diagram showing the transition between these two modes. Cross-stream migration and equilibrium trajectories of particles are also investigated and found to depend on the particle shape and mode of motion. The simulations results are compared with experimental data showing favorable agreement. Our results will be useful for separating biological and synthetic particles by size and shape.

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