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Critical thresholds on compressible Eulerian dynamics with nonlocal alignment

Abstract. We consider compressible Eulerian dynamics with a nonlocal interaction term. The system arises from hydrodynamic flocking models which characterize the phenomenon that individuals emerge to the same direction under simple interactions. We show that any strong solution of the system has the flocking property. In this talk, I will discuss when the system has a global strong solution. Our main result says that there are critical thresholds for the existence of global strong solution, and the thresholds depend only on the initial configuration. A subcritical initial data will lead to strong solution and converges to a flock. On the other hand, a supercritical initial data will blowup in finite time. This is a joint work with Eitan Tadmor.