

On the sticky particle solutions to the multi-dimensional pressureless Euler equations

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Abstract: In this talk we consider the multi-dimensional pressureless Euler system and we tackle the problem of existence and uniqueness of sticky particle solutions for general measure-type initial data. Although explicit counterexamples to both existence and uniqueness are known, the problem of whether one can still find sticky particle solutions for a large set of data and of how one can select them was up to our knowledge still completely open. In this talk we prove that for a comeager set of initial data in the weak topology the pressureless Euler system admits a unique sticky particle solution given by a free flow where trajectories are disjoint straight lines. Indeed, such an existence and uniqueness result holds for a broader class of solutions decreasing their kinetic energy, which we call dissipative solutions, and which turns out to be the compact weak closure of the classical sticky particle solutions. Therefore any scheme for which the energy is l.s.c. and is dissipated will converge, for a comeager set of data, to our solution, i.e. the free flow.