

Dynamics of Newtonian stars

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I will discuss the dynamics of Newtonian stars governed by the gravitational Euler-Poisson system with a particular focus on dynamics near Lane-Emden equilibria. While Lane-Emden stars between the mass-critical and energy-critical regimes are known to be nonlinearly unstable, their long-time nonlinear dynamics is yet to be understood. I will review recent progress and present upcoming joint work with Hadžić, Oh and Sandine on a new instability mechanism: accelerated shock formation near the energy-critical Lane-Emden star.