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# Bi-Poisson: a RAMSES implementation of two coupled Poisson equations

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## Abstract

In this talk, I will present some new results on galaxy dynamics obtained with my RAMSES patch Bi-Poisson. Bi-Poisson allows to model gravitational processes where two species of particles are present and follow different (coupled) Poisson equations. I applied it to the specific case of the Dirac-Milne cosmology. There, an exotic "negative mass" type of particles is coupled through gravity to standard "positive mass" particles. We have run modest N-body experiments and were able to measure scaling relations (eg. Tully-Fisher) for the resulting structures. The generic pattern for the resulting structures is quite remarkable: the standard matter collapses to form the usual galactic core. The matter structures are then surrounded by a totally empty zone that we dubbed the depletion zone in analogy with condensed matter. Finally the second "negative mass" species bathes the simulation box and gives a resulting force that may resemble in amplitude to a MOND-type force.

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