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A detailed description of the subhalo population of the Milky Way

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Abstract content

In the standard model of cosmic structure formation, dark matter haloes form by gravitational instability. The process is hierarchical: smaller systems collapse earlier, and later merge to form larger halos. The probability that a halo of mass m at redshift z will be part of a larger halo of mass M at the present time is described by the progenitor (conditional) mass function f(m,z|M,0), according to the so called extended Press & Schechter theory. Using the progenitor mass function we calculate analytically, at redshift zero, the distribution of subhalos in mass, formation epoch and rarity of the peak of the density field at the formation epoch. That is done for a Milky Way-size system, assuming both a spherical and an ellipsoidal collapse model. Our calculation assumes that small progenitors do not loose mass due to dynamical processes after entering the parent halo, nor that they interact with other subhalos. For a LCDM power spectrum we obtain a subhalo mass function dn/dm proportional to mˆalpha with a model-independent alpha˜2, confirming what is found in N-body simulations. The inferred distributions can be used to test the feasibility of indirect detection of such a population of subhalos with modern experimental tecniques.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 4 (HE part 1), pages 757-760

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