



Séminaire du Laboratoire de l'Accélérateur Linéaire

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Dark matter and MOND

A wealth of astronomical data indicate the presence of mass discrepancies in the Universe. The motions observed in a variety of classes of extragalactic systems exceed what can be explained by the mass visible in stars and gas. Either (i) there is a vast amount of unseen mass in some novel form - a dark matter fluid made of particles - or (ii) the data indicate a breakdown of our understanding of dynamics on the relevant scales, or (iii) both. Here, we show that it is actually possible to predict the gravitational field of galaxies from their baryons alone, which presents a challenge to the particle dark matter interpretation, and may thus indicate a breakdown of our understanding of gravitation and dynamics (the MOND hypothesis). On the other hand, it is obvious that any alternative based on MOND in galaxies must also, in fine, reproduce the successes of the standard cosmological model on large scales, where this model is so well-tested that it presents by itself a challenge to any such alternative. An effective modification of dynamics on galaxy scales might just mean that the actual lagrangian of the dark sector is very different and richer than currently assumed in the standard cosmological model. For instance, the model based on "dipolar dark matter" is up to now the best attempt at reconciling the successes of Lambda-CDM on large scales with those of MOND on galaxy scales.

Salle 101 du LAL - Bât. 200, Orsay

Thé et café seront servis 1/4 h avant le séminaire



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