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Seminar of the theory group of APC

Mardi 7 Avril 2015, 14 :00
APC, 483A Malevitch
Domaines : hep-th

Titre : *Gravitational collapse, primordial black hole formation and quasi static solutions of compact objects in Chameleon Models*

Orateur : **Ilia Musco (LUTH)**

Résumé : *Gravitational collapse is the main mechanism leading to structure formation of different types in the Universe. The phenomenology depends on the characteristics of the matter involved, with there being a crucial distinction between zero and non-zero rest-mass particles. In the very early universe, when the matter is characterised by a barotropic equation of state (pressure proportional to the energy density), only black holes could have been formed. I the first part of the talk I will explain the mechanism of formation of these objects, called primordial black holes. They be can be considered as interesting sources of different signals due to black hole evaporation, as also being the seeds of the very massive black holes that we think are in the centre of galaxies like the Milky Way. In the second part I will move to a different problem, analyzing quasi-static spherically symmetric solutions in presence of scalar fields, to understand the screening mechanism, known as Chameleon. Considering objects such as standard stars and more compact objects like white dwarfs and neutron stars, I am solving the Tolman- Oppenheimer-Volkoff equations coupled with the Klein-Gordon equation in a quasi static regime, keeping into account the background expansion without needing to introduce an artificial cosmic matter that corresponds to a non-spatially flat metric. The interior of the star is solved using a polytropic equation of state matching the solution outside onto the cosmic density of an expanding spatially flat background.*