SEMPARIS – Séminaires en région parisienne

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Seminaires du LPTM , Universite de Cergy Pontoise

Jeudi 22 Novembre 2018, 14 :00
LPTM, 4.13 St Martin II
Domaines : math-ph

Titre : *Early Universe in the de Broglie-Bohm pilot-wave theory*

Orateur : **Samuel Colin (LPTM UCP Cergy Pontoise)**

Résumé : *According to the de Broglie-Bohm pilot-wave theory, a quantum system is not only described by its wave-function, but also by a configuration, which is guided by the wave-function in a deterministic way (in the case of a non relativistic particle, this configuration is simply a particle position). A quantum ensemble, on the other hand, is described by a wave-function and by a distribution of configurations. The pilot-wave theory reproduces the predictions of standard quantum mechanics for ensembles in which the configurations are distributed according to the Born Law. In principle, the pilot-wave theory also allows ensembles in which the configurations are not distributed according to the Born Law : such ensembles are said to be in quantum non-equilibrium and for them standard quantum mechanics is violated, thereby leading to new physics. In the talk, I will give an overview of the pilot-wave theory and I will present this idea of quantum non-equilibrium. Then I will show that quantum non-equilibrium can provide an explanation for an anomaly in the data of the Planck satellite mission (it is an anomalous power deficit at large angular scales in the cosmic microwave background spectrum). Finally, I will give an example of the application of the pilot-wave approach to simple quantum cosmological models, to show that the existence of a configuration, beside the wave-function, allows to obtain cosmological scenarios unambiguously (here the example will be that of a bouncing universe with a dark energy phase during its expansion).*