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Seminar of the theory group of APC

Mardi 9 Fevrier 2016, 14 :00
APC, 483A Malevitch
Domaines : hep-th

Titre : *Hiding and seeking dark energy*

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Résumé : *The discovery of the accelerated expansion of the universe has motivated an intense activity in infrarred modifications of gravity with an additional scalar degree of freedom. This scalar is then used to replace the cosmological constant as the responsible for the cosmic acceleration. A common problem in these models is that this scalar must be very light to have cosmological effects today. However, it typically mediates a long- range force that has not been observed in local gravity tests and this severely constraints such models. A resolution to this problem came about with the implementation of screening mechanism that allow to avoid local gravity tests while still having relevant cosmological effects. I will review some models featuring the different screening mechanism existing in the literature and how they work to evade local gravity tests. However, evading Solar System bounds leads in many cases to tight constraints for the cosmological evolution of the scalar field. I will pay special attention to the so-calle chameleon and Vainshtein mechanisms. For the chameleon, the local gravity constraints prevents the scalar to drive self-accelerated solutions and, furthermore, to have an impact in structure formation at linear scales. For a class of theories featuring a Vainshtein mechanism, I will argue how the cosmological evolution of the field can induce non-screenable effects in local gravity observables, mainly a time-variation in Newton's constant and an anomalous propagation speed of gravitational waves. These effects are then constrained using solar system and binary pulsar constraints.*
