SEMPARIS – Séminaires en région parisienne

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Cours

Vendredi 24 Juin 2016, 10 :00
IPHT, Salle Claude Itzykson, Bât. 774
Domaines : physics

Titre : *Gravitational waves (4/5)*

Orateur : **Chiara Caprini (IPhT)**

Résumé : *The first direct detection of gravitational waves, announced last February, marks a milestone for both theoretical and experimental physics, occurring one hundred years after the prediction of gravitational waves by Einstein in 1916, and fifty years after the first experimental efforts to detect them, which started in the 1960s.*

This course is an introduction to the theory of gravitational waves, aiming to provide a basic knowledge of the subject and its principles. It will only present the linearised theory and therefore requires a minimal expertise in General Relativity. If time allows, the course might end with applications to cosmology, such as standard sirens and possible stochastic background of gravitational waves from the very early universe.

The plan is the following :
1. Derivation of the wave equation in linearised theory and definition of the transverse traceless gauge
2. Interaction of gravitational waves with test masses and the principles of interferometric detection
3. Definition of the gravitational wave energy momentum tensor and gravitational wave propagation on a curved background
4. Generation of gravitational waves in linearised theory and derivation the quadrupole formula
5. The inspiral of compact binaries, gravitational wave frequency and waveform
6. Applications to cosmology