



# *COURS DE PHYSIQUE THÉORIQUE DU SPHT*

## ANNÉE 2003-2004

Les vendredis de 14h30 à 16h00 au SPHT, Orme des Merisiers, Bat.774, Salle Itzykson

### *Aspects of General Relativity in higher dimensions*

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Les 30 avril, 7 mai, 19 mai, 28 mai et 4 juin.

This course will treat some questions that arise when we consider General Relativity (GR) theory in more than 4 dimensions. It will be accessible to students at a DEA level who have followed a course on classical General Relativity (like, for instance, the one given by B. Linet at the ENS in March or at the Maîtrise level). The course will begin with a basic reminder of the most important aspects of GR that we will use. It will be accompanied by exercises and open questions. Possible implications to cosmology will be discussed.

#### *Outline :*

- Brief reminder of the basic tools of relativity and notation. De Sitter and anti de Sitter spacetimes and their basic properties. How hypersurfaces can be embedded in such spacetimes. From linear gravitational perturbations to the question of localisation or delocalisation of gravity on such hypersurfaces. Implications on braneworld models.

- Black hole spacetimes : basic properties and relation to their 4-dimensional counterparts. Implications of such spacetimes and classical black hole theorems to braneworld cosmology.

- Techniques of construction of higher dimensional solutions from 4-dimensional ones.

- Possible extensions of Einstein's theory in higher dimensions and some of their implications.

Les cours sont de nature introductive et donc accessibles aux étudiants en deuxième année de troisième cycle et/ou école doctorale. Ils sont ouverts aux physiciens de toute discipline et à toute personne intéressée.