



PHYS2143 General relativity and cosmology

[22.5h+15h exercises] 5 credits

This course is taught in the 1st semester

Teacher(s): Jean-Marc Gérard
Language: French
Level: Second cycle

Aims

A detailed description of general relativity, including the mathematical tools needed. Introduction to Einstein and Lemaitre's cosmology.

Main themes

1. Introduction : from Newton's theory of gravitation to Einstein's equivalence principle.
2. Mathematical tools : differential geometry; tensors
3. Tests of general relativity around a massive spherical object : gravitational redshift and time dilatation; precession of Mercury perihelion; light deflection; radar echo; black holes; gravitational waves.
4. Cosmology : from Einstein's static universe to Lemaitre's expanding universe.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequisites: theory of restricted relativity

Other credits in programs

MAP22	Deuxième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(5 credits)	
MATH21/G	Première licence en sciences mathématiques (Général)	(5 credits)	
MATH22/G	Deuxième licence en sciences mathématiques	(5 credits)	
PHYS21/A	Première licence en sciences physiques (Physique appliquée)	(5 credits)	Mandatory
PHYS21/G	Première licence en sciences physiques	(5 credits)	Mandatory
PHYS21/T	Première licence en sciences physiques (Physique de la terre, de l'espace et du climat)	(5 credits)	