Introduction to *General Relativity* and its *astrophysical applications*

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General Informations

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General Informations

Dates, etc.

- Lectures: Tuesdays, 10.15 – 11.45
  Thursdays, 10.15 – 11
- Tutorials: Thursdays, 11.15 - 12.45

- Weekly home work
  (Pranjal Trivedi and Shadi Shaker)

- Credits: 7 LP
- Exam: July 13. 2017 (tbc)
  admission: 50% of work sheets + bonus points

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Outline / Topics

Lecture is based on James Hartle's book:
GRAVITY: An introduction to Einstein's General Relativity,
Addison Wesley, 2003

- Newton's physics of gravity
- Curvilinear space
- Geometry as physics (and vice versa)
- Concepts of *Special Relativity* / SPACETIME
- The Equivalence Principle
- Curved SPACETIME
- Geodesics
- Differential Geometry (a pragmatic summary)
- Einstein's field equations

General Informations

Outline / Topics

- Applications:
  - Schwarzschild metric
  - Black holes
  - Kerr black holes
  - Accretion discs
  - Gravitational lensing
  - Gravitational waves
  - Pulsars
  - Cosmology in a nut shell
  - ...

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further literature

- James Hartle: *GRAVITY: An introduction to Einstein's General Relativity*, (2003)
- Misner, Thorne & Wheeler: *GRAVITATION* (1973, "the brick")
- Padmanabhan: *Gravitation: Foundations and Frontiers* (2010)
- Bernard Schutz: *A first course in General Relativity* (2009)
- Ray d'Inverno: *Introducing Einstein's Relativity* (1990)
- ...

- online: www.bartleby.com/173:
  Relativity: The Special and General Theory
  Translation of Einstein's original book (1920)