

# 136.012 Cosmology and particle physics

2016S, VO, 2.0h, 3.0EC

**Lecturer:** Timm Wrase (Freihausgebäude, Tower B, yellow section, 10<sup>th</sup> floor, DB10J03)

**Email:** [timm.wrase@tuwien.ac.at](mailto:timm.wrase@tuwien.ac.at)

**Organizational meeting:** Monday March 7<sup>th</sup>, 15:15 – 16:00, seminar room DA green 05\*

**Meeting time and place:** Mondays from March 14<sup>th</sup> until June 27<sup>th</sup>, 15:15-16:45,  
Seminar room DA green 05\*

\*Freihausgebäude (Wiedner Hauptstr. 8) - Tower A, green section, 5. OG, DA05E10

**Examination modalities:** Grades will be based on weekly written homework. It is possible to improve the grade by taking an oral exam.

This introductory course in “Cosmology and particle physics” is aimed primarily at Master students but open to anybody who wants to learn more about cosmology, i.e. about the study of our universe at large scales. In the course you will learn about the evolution of our universe from the Big Bang until today. In particular we will discuss the so called standard model of cosmology (the  $\Lambda$ CDM model). Special emphasis will be placed on inflation, a period of rapid expansion of the universe shortly after the Big Bang. We will also discuss dark energy, which is the dominating form of energy in the current universe.

## Literature:

S. Weinberg: “Cosmology”

E. W. Kolb and M. S. Turner: “The early universe”

J. E. Peacock: “Cosmological physics”

P. J. E. Peebles: “Principles of Physical Cosmology”

Lecture notes that I found very useful in preparing this class:

J. Rosa: “Introduction to Cosmology”, <http://gravitation.web.ua.pt/index.php?q=node/247>

D. Baumann: “Cosmology” <http://www.damtp.cam.ac.uk/user/db275/Cosmology.pdf>

To refresh or learn general relativity:

S. Carroll “Lecture Notes on General Relativity” <http://arxiv.org/abs/gr-qc/9712019>

R.M. Wald “General Relativity”