

Technical Points

- **Lecture**
 - students in physics 3. semester and higher
 - IMPRS students (exercises/examination mandatory)
- **Exercises**
 - 2-3 times per week: 15:15 – 17:00
 - 1. week: Mo, 17.9., + Thu, 20.9.
 - CIP-Pool Albert-Ueberle-Str. 3-5, 2. floor
 - working in groups (2-3 people)
 - presence + homework
- **1 written examination (Thursday, 4th Oct.)**
 - certificate for >60% success

Contents

1. Introduction
2. Fundamentals
3. Telescopes and instruments
4. Stelardynamics
5. The Milky Way
6. Sun and planetary system
7. Stars
8. Stellar evolution
9. Interstellar medium
10. Galaxies
11. Cosmology

Contents

1. Introduction
 1. Literature
 2. Organization of the astronomy
 3. Astronomical institutes at Heidelberg
 4. Historical overview
2. Fundamentals
 1. Orbit of Earth and Moon
 2. Coordinate systems
 3. Time determination
 4. Positions of stars
 5. Measurable radiation

Contents

3. Telescopes and instruments
 1. The standard telescope
 2. Optical telescopes/ UV
 3. Infrared techniques
 4. X-ray telescopes
 5. Radio astronomy
 6. Gamma-ray telescopes
 7. Gravitational wave / Neutrino observations

Contents

- 4. **Stellardynamics**
 - 1. N-body systems
 - 2. Dynamical equilibrium
 - 3. Evolution of stellar systems
- 5. **The Milky Way**
 - 1. Distance determination
 - 2. Structure of the Galaxy
 - 3. Rotation and spiral arms
 - 4. The Galactic centre
 - 5. Halo and Local Group

Contents

- 6. **Sun and planetary systems**
 - 1. Properties of the Sun
 - 2. Solar planetary system
 - 3. Extrasolar planets
 - 4. Planet formation
 - 5. SETI
- 7. **Stars**
 - 1. Classification
 - 2. Stellar atmospheres

Contents

- 8. **Stellar evolution**
 - 1. Inner structure of the stars
 - 2. The life of stars
 - 3. Variable stars
- 9. **Interstellar Medium**
 - 1. Components and their properties
 - 2. Star formation
 - 3. Chemical evolution
 - 4. Lifecycle in galaxies

Contents

- 10. **Galaxies**
 - 1. The present-day population of galaxies
 - 2. Galaxy nuclei
 - 3. The distribution of Galaxies
 - 4. Galaxy evolution
 - 5. The intergalactic medium
- 11. **Cosmology**
 - 1. Historical overview and the basic picture
 - 2. Describing space
 - 3. Mass fluctuations in the universe
 - 4. Testing the evolution of the universe
 - 5. The (very) early universe