

# Astrophysics

Module No.: MN-P-SP-Astro, MN-P-PN-Astro, MN-P-WaMa

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## Course: Observational Methods in Infrared Astronomy

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Category	Type	Language	Teaching Hours	CP	Semester
Specialized Course	Lecture	English	2+1	4.5	SuSe
Specialized Course	Lecture	English	2	3	SuSe

### Requirements for participation:

Atomic Physics, Astrophysics I

### Type of module examinations:

One oral examination at the end of the module

### Duration of Course:

1 semester

### Aims of the course:

The aim of the lecture is to give a detailed insight into the observational and instrumental techniques currently used in infrared astronomy, with an emphasis on high-angular resolution studies. The objective is to give the students the necessary technical background to understand the complete chain going from data acquisition, data calibration, data reduction and scientific interpretation. This lecture efficiently prepares those students that wish to start observational work in astrophysics in a professional environment.

### Contents of the course:

- Infrared spectral range, observing sites
- Atmospheric turbulence and seeing
- Thermal background suppression and calibration, chopping and nodding
- Wavefront sensing, adaptive optics, laser guide stars
- Photometric calibration, PSF calibration
- Low-, medium-, and high-resolution spectroscopy; integrated field spectrograph
- Optical/Infrared detectors and error budget (SNR)
- Basics of data reduction, dark and flats
- Aperture photometry, line fitting, psf subtraction
- Image deconvolution, astrometry and orbital solutions
- Astronomy image file formats (fits, oifits) and tools (VO)

### Recommended literature:

- A. Daniel J. Schroeder: Astronomical Optics (Academic Press, 2000)
- B. Pierre Léna, F. Lebrun: Observational Astrophysics (A&A Library)
- C. A. Glindemann: Principles of Stellar Interferometry (Springer)
- D. Bradley W. Carroll: An Introduction to Modern Astrophysics (Pearson Editor)