

# Astrophysics and Molecular Physics

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

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## Course: The Fourier-Transform and its Applications

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

### Requirements for participation:

Elementary Physics, Elementary QM

### Type of module examinations:

Exercise and written test; or oral examination, and one oral examination at the end of the module

### Duration of the course:

1 semester

### Aims of the course:

Strengthen inside into how the mathematical principles of Fourier Theory as a common principle affects many areas of physics (optics: diffraction/interference; QM: Heisenberg principle; statistics of noise and drifts; data acquisition: sampling) and other applications (data compression, signal processing).

### Contents of the course:

- Introduction to the principles of Fourier Transform mathematics
- Delta-function and more general distributions
- Diffraction optics and interferometry
- Uncertainty principle in QM as application of FT
- Theory of noise, drifts and their statistics
- Intro to wavelet analysis and data compression

### Recommended literature:

Bracewell: The Fourier Transform and its Applications