Primary Area of Specialization: Astrophysics

Module No.: MN-P-SP-Astro

Course: The Fourier-Transform and its Applications

Lecturers: Jürgen Stutzki
Email: stutzki@ph1.uni-koeln.de

Category	Type	Language	Teaching Hours	CP	Semester
Specialized Course	Lecture	English	2+1	4	WT

Requirements

Preparation:
Elementary Physics, Elementary QM

Form of Testing and Examination:
Exercise and wirtten test; or oral examination

Length of 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