

Hercules 2020 – Introductory Lecture: Fourier Transform – Basic Concepts

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Abstract:

This lecture will introduce the mathematical concept of the Fourier transform and explain its central importance in the field of diffraction. It will show how diffraction patterns can be understood from the point of view of Fourier analysis. The application of Fourier analysis in crystallography and fibre diffraction will be demonstrated at an introductory level. Some of these latter concepts will be developed further in Session B Lecture: Fibre Diffraction.

Lecture plan:

Part1: Introduction to Fourier transforms

- i. Fourier series to Fourier transforms
- ii. Fourier transforms of simple functions
- iii. Objects and crystals

Part2: The Fourier transform and diffraction

- i. Diffraction geometry and the Fourier transform
- ii. Helical Diffraction
- iii. Fourier transforms and the DNA double helix