Lectures and Workshops, January 2011, Physics Building, Koszykowa 75

Crystallography and Diffraction
Theory and Modern Methods of Analysis

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Aims
This course aims to introduce basic concepts in crystallography and provide practical experience in modern methods of diffraction data collection and analysis.

Lectures
Crystal symmetry, the reciprocal lattice 5 January, Wednesday, 14:15-17:00 room 309
Diffraction theory 11 January, Tuesday, 16:15-18:00 room 111
Single crystal X-ray diffraction 13 January, Thursday, 10:15-12:00 room 111
Powder diffraction of X-rays and neutrons 13 January, Thursday, 14:15-16:00 room 309
Rietveld analysis 20 January, Thursday, 10:15-12:00 room 111
Electron diffraction 20 January, Thursday, 14:15-16:00 room 309
Amorphous materials 25 January, Tuesday, 16:15-18:00 room 111

Workshops
Crystal symmetry, determination of space groups 12 January, Wednesday, 14:15-17:00 room 309
Relationships between direct and reciprocal space 18 January, Tuesday, 16:15-18:00 room 111
Structure determination from single crystal X-ray data 19 January, Wednesday, 14:15-17:00 room 309
X-ray powder diffraction data collection (laboratory) 26 January, Wednesday, 14:15-17:00 room 19
and 14:15-16:00 room 309
Rietveld analysis 27 January, Thursday, 10:15-12:00 room 111

Learning Outcomes
By the end of this course students should be able to:

• Describe the symmetry of crystals including determination of space groups from diffraction data.
• Sketch the reciprocal lattice for monoclinic and orthogonal crystal lattices and explain the relationship between direct and reciprocal lattices.
• Describe the principles of diffraction methods as applied to crystalline solids, including the limitations and capabilities of diffraction methods.
• Describe the processes involved in data collection and structure determination from single crystal X-ray diffraction data.
• Describe and carry out X-ray diffraction data collection from powder samples.
• Perform Rietveld analysis on powder diffraction data and to interpret the results.
• Understand the concepts of electron diffraction.
• Describe the procedures for diffraction analysis of amorphous solids.