

Advanced transmission electron microscopy
Oct. 3- Nov. 2, 2018

KZ8010 7.5hp <http://sisu.it.secure.su.se/search/info/KZ8010/en>

The course will start on October 3 (Wednesday) at 9:15 in room C516 (SÖ), Arrhenius Laboratory, Stockholm University. Lectures, problem solutions and practical training sessions are conducted at 9:15-12:00 and 13:00-16:00 according to the detailed schedule below. Demonstrations, problem solutions, practical training sessions and group project are the *compulsory parts* in the course.

Teachers:

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Literature:

WC: *Transmission Electron Microscopy: A Textbook for Materials Science*, D.B.Williams and C.B.Carter, Springer
ZHO: *Electron Crystallography - Electron microscopy and electron diffraction*, X. Zou, S. Hovmöller and P. Oleynikov, Oxford University Press

* Additional materials may be given in the lectures and practical sessions.

The actual date of lab and exercise depends on the number of participants and will be finalized at the beginning of the course.

Week	Date		Teacher	Lecture (9:15 – 12:00)	Literature	Lab (13:00-16:00) #
40	3/10 (Wed)		XZ	General introduction		
		L1	XZ	Basics of electron crystallography-methods for structure solution	ZHO 1-3	Group 1 & 2 project – sample preparation
	5/10 (Fri)	L2	XZ	New electron diffraction techniques and quantification of electron diffraction	ZHO 5	Computer lab: RED data processing – obtain ED data for structure solution
41	9/10 (Tue)	L3	XZ	Structure determination and refinement from SAED -SHELX	ZHO 9-10	Group 1 project – ED and cRED data collection [‡]
	10/10 (Wed)	L4	TT	Kikuchi Pattern, CBED	WC19-21	Group 2 project – ED and cRED data collection [‡]
	12/10 (Fri)	L5	TT	Various image contrasts - thickness and Bend contours	WC23	Computer lab: Structure determination from RED data
42	16/10 (Tue)	L6	TW	Defects (stacking fault, dislocation)	WC25-26	Group 1 & 2 project – ED and cRED data analysis
	17/10 (Wed)	L7	TW	Quantification and processing of HRTEM images	ZHO 6-8	Computer lab: Structure determination from HRTEM
	19/10 (Fri)	L8	TW	3D reconstruction by electron tomography and electron crystallography	ZHO 11*	Group 1 project – HRTEM data collection [‡]
43	22/10 (Mon)	L9	TT	STEM (BF, ADF & HAADF)	WC31*	Group 2 project – HRTEM data collection [‡]
	23/10 (Tue)	L10	TT	STEM (BF, ADF & HAADF), Electron energy loss spectroscopy (EELS)	WC31* WC37-40*	Group 1 & 2 project – HRTEM data analysis
	25/10 (Thu)	L11	TT	Electron energy loss spectroscopy (EELS)	WC37-40*	Group 1 STEM + EELS demo
	26/10 (Fri)	L12	TT	Electron energy loss spectroscopy (EELS), data treatment	WC37-40*	Group 2 STEM + EELS demo
44	29/10 (Mon)	Project Presentation (13:15-16:00)				
	2/11 (Fri)	Examination (9:15-14:00)				

[‡] Students will be divided in groups and each group only needs to take one ED data collection and one HRTEM data collection session.