

Graduate course in Synchrotron radiation based Science (7.5 hp)

Sweden has a longstanding tradition in the development and application of storage ring based x-rays – synchrotron radiation – and will inaugurate on June 21, 2016 the world' s finest facility of this kind – the MAX-IV laboratory at Brunnshög in Lund.



This course gives fundamental knowledge about modern synchrotron radiation sources and free-electron lasers and prepares for their practical use. The properties of the x-radiation such as energy and angular distribution, brilliance, polarization, time structure and coherence from insertion devices such as undulators and wigglers and their fundamental properties are covered. Experimental methods for detecting photons and charged particles such as electrons as response to the interaction of x-radiation with matter are discussed in connection to different research areas. The basics of free-electron lasers are treated in view of different applications utilizing highly intensive femtosecond x-ray pulses.

Course contents

- The layout of a synchrotron radiation storage ring.
- The properties of x-rays created in a storage ring: emittance and brilliance, radiated power, time structure, polarization. Undulators and wigglers. Optics for VUV and x-rays. Monochromators.
- The function of free-electron lasers and their significance.
- Applications of synchrotron radiation in physics, chemistry, biology, materials science and nanoscience.

Course instructor: Prof. Raimund Feifel, Department of Physics, University of Gothenburg, e-mail: raimund.feifel@physics.gu.se

Starting date: December 1, 2015.

Course meetings and evaluation: the course will be given, in a compact and intensive form, during the period December 1 – December 18, 2015 where the exact time schedule will be agreed on with the participants. The evaluation will be based on hand-in problems and seminar presentations.

Please apply no later than November 27, 2015 by sending a message to the course instructor who also will answer any further questions on this course.