Second OASYS School

DATES

Wednesday 11, Thursday 12, Friday 13 December 2019

SCOPE

The second OASYS school will be a hands-on meeting to fully explore the possibilities of the various tools found in the OASYS suite. These tools perform full simulations on synchrotron radiation beamlines and associated instruments. The school will cover the calculations of the power and flux emitted by the different synchrotron sources, the simulation of complete beamlines using ray tracing and wavefront methods and the automation of the simulations using python-scripts. Our three-day school will conclude with a code camp to learn how to program new OASYS add-ons and applications.

Audience is typically composed scientists, engineers, technicians, or managers who wish to learn more about simulations in x-ray optics applied to synchrotron instrumentation using OASYS. In particular, they will understand the characteristics of a synchrotron beam and obtain quantitative information on emitted flux and power, simulate the optical performance of a beamline, and apply a variety of tools to simulate partial coherent beams.
This course will enable you to:

- describe/import the beamline elements in terms of the SYNED containers
- calculate power and flux emitted by synchrotron (white) sources and affecting the optical elements
- select and combine rays and wavefronts to describe synchrotron radiation by ray tracing and wavefront propagation, respectively. Be familiar with SHADOW, WOFRY and the OASYS distribution of SRW.
- quantify the beam characteristics (flux, dimensions, intensity profiles) and compute optical images from geometrical and synchrotron sources
- transfer coherence into and throughout optical systems using Monte Carlo methods (SRW) and coherence mode decomposition (COMSYL).

- automatize tasks and perform long calculations using python scripts.
- learn how to extend OASYS functionalities writing new widgets and new applications.

PROGRAMME

Wednesday 11 December (8:00 AM - 5:00 PM)

This first session is dedicated to calculate the flux and power emitted by synchrotron sources and simulate the beamline elements with ray tracing.

- Source emission (flux and power) using XOPPY
- Ray tracing a beamline with ShadowOui

Thursday 12 December (8:00 AM - 5:00 PM)

This second day will be dedicated to simulate optical systems and also a beamline using wave optics methods

- Combining ray tracing and wave optics with the HYBRID method
- Describe simple systems showing interference and diffraction using WOFRY
- Simulating a complete beamline with the OASYS distribution of SRW
- Introduce methods for partial coherence: Monte Carlo multi-electron analysis with COMSYL, and coherence mode decomposition with COMSYL.

Friday 13 December (8:00 AM - 12:00 AM)

This third day will be a full-day code camp to learn how to create new OASYS widgets and add-ons. It will also serve as a platform to learn how to automatize tasks in making parametric calculations and to perform long runs using scripts that run in a cluster.

INSTRUCTORS

M. Sanchez del Rio (ALS), Luca Rebuffi (APS) and Xianbo Shi (APS).