INTRODUCTION TO OASYS AND THE NEW SHADOW INTERFACE SHADOWOUI

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OUTLINE

- **SOS (**Software for Optical Simulations) workshop，Oct. 3rd – 7th, Trieste
- **OASYS:** an open-source Graphical Environment for optic simulation softwares used in synchrotron facilities
- **ShadowOui,** the OASYS user interface for the ray tracing code Shadow3, and **XOPPY**, the python version of XOP
  - Demo
  - ShadowOui-Hybrid
- OASYS-ShadowOui training course by Luca Rebuffi (during the week of Dec. 12-16)

SOS WORKSHOP

Oct. 3rd – 7th, Trieste, Italy.

https://www.elettra.eu/Conferences/2016/SOS/

- Presentations and practical sections given by optical simulation software developers from ESRF, ANL, BNL, Elettra and industry.
- Audients: not only for software developers or expert users, but also for scientists, researchers and students approaching the matter for the very first time.
- Software: OASYS, ShadowOui, SRW, SRW GUI, VirtualLab Fusion…
- Invited APS speakers:
  - Ruben Reininger: Soft X-ray beamline design
  - Sergey Stepanov: X-ray Server
  - Xianbo Shi: ShadowOui-Hybrid, MOI propagation

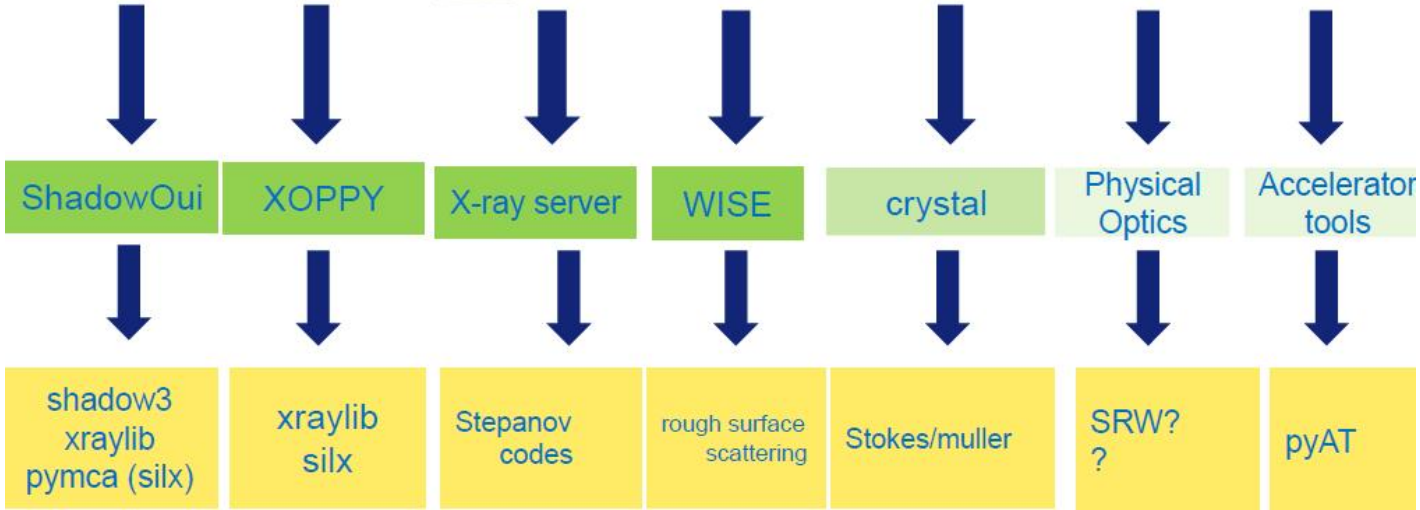
OASYS

OrAnge SYnchrotron Suite, http://www.elettra.eu/oasys.html

Manuel Sanchez del Rio (ESRF), Luca Rebuffi (Elettra)

Graphical environment for optics (and more) simulations

- Python-based
- Module add-ons
- Packages that communicate

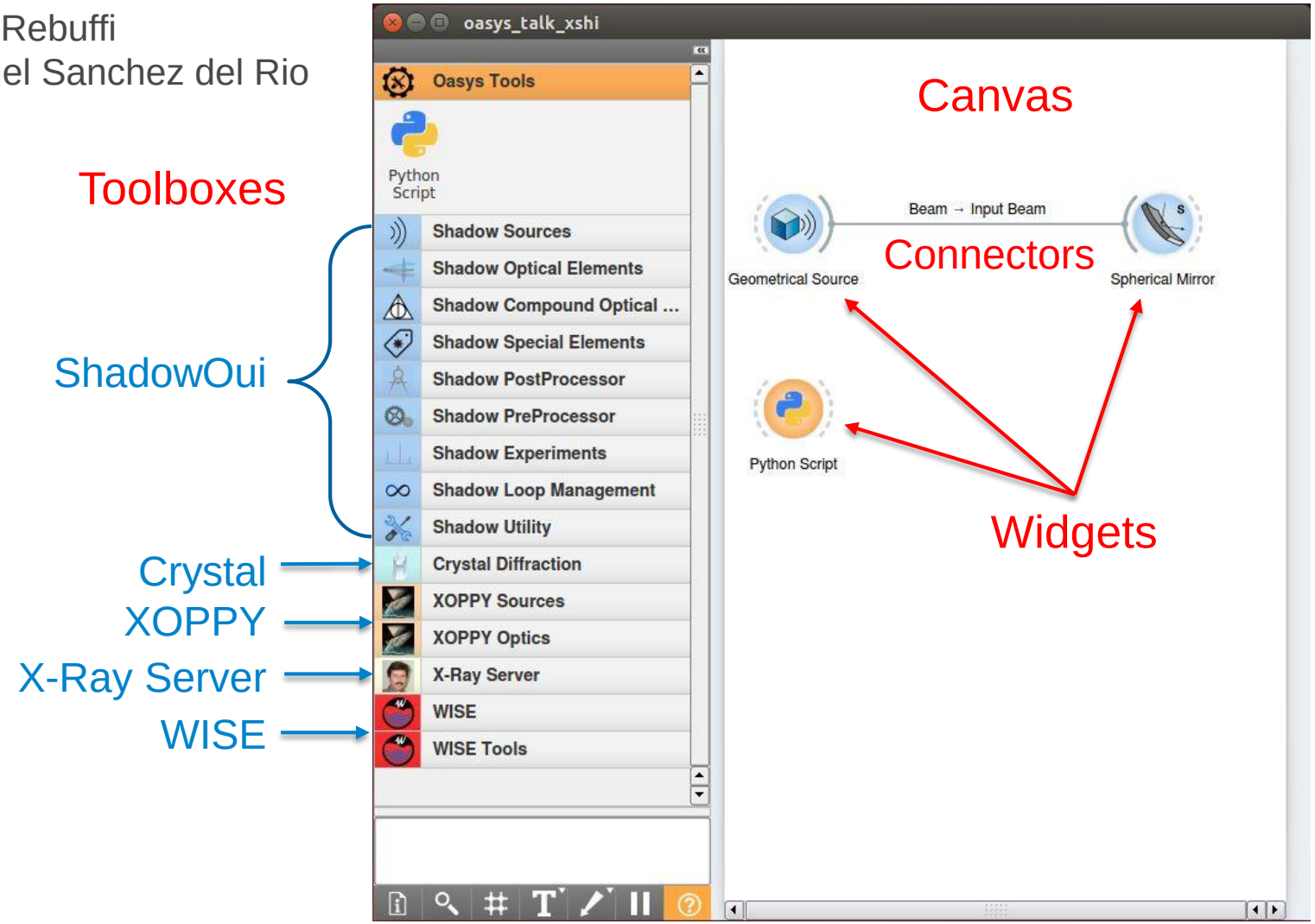


M. Sanchez del Rio, et al, Proc. SPIE 9209, 92090X (2014)

OASYS

OrAnge SYnchrotron Suite, http://www.elettra.eu/oasys.html

Luca Rebuffi
Manuel Sanchez del Rio



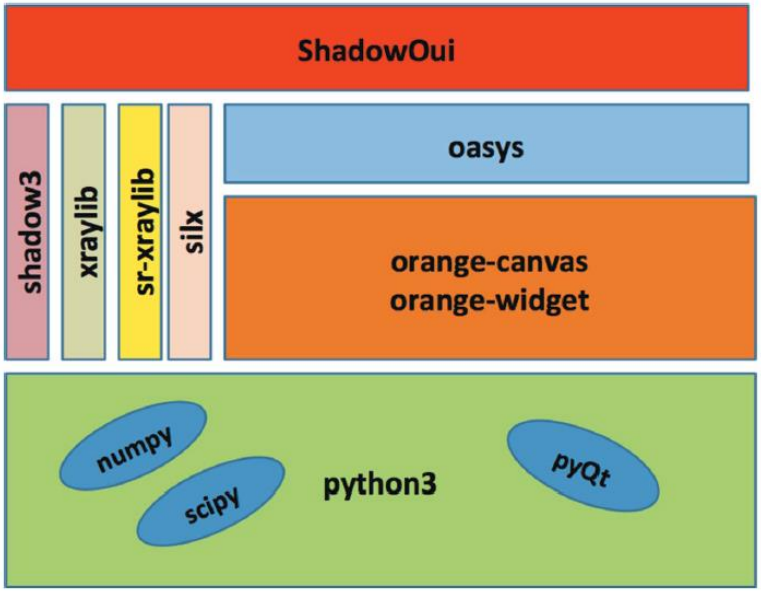
OASYS INSTALLATION

https://github.com/srio/oasys-installation-scripts/wiki

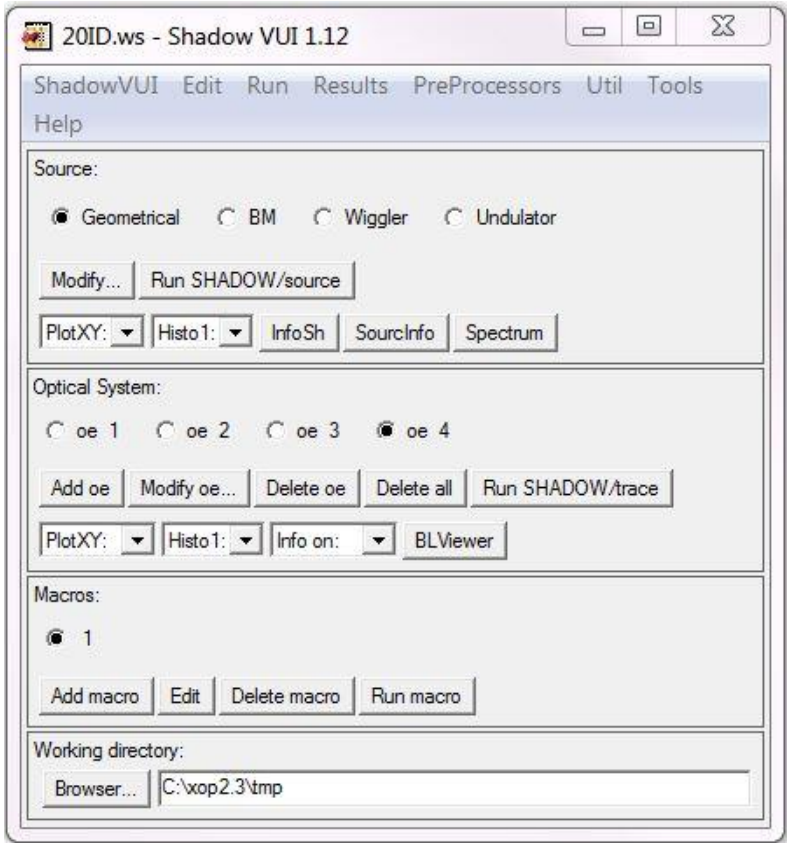
- Mac
  - A. Binary: http://ftp.esrf.eu/pub/scisoft/Oasys/
  - B. Install Oasys from sources: https://github.com/srio/oasys-installation-scripts/wiki/Installing-Oasys-in-a-virtual-environment-(Linux-and-Mac)
  - C. Install Oasys in a linux VirtualBox.
- Linux
  - B. Install Oasys from sources: https://github.com/srio/oasys-installation-scripts/wiki/Installing-Oasys-in-a-virtual-environment-(Linux-and-Mac)
  - C. Install Oasys in a linux VirtualBox.
- Windows
  - C. Install Oasys in a linux VirtualBox: https://github.com/srio/oasys-installation-scripts/wiki/Install-Oasys-in-a-VirtualBox

SHADOWOUI

https://github.com/lucarebuffi/ShadowOui



XOP - ShadowVUI

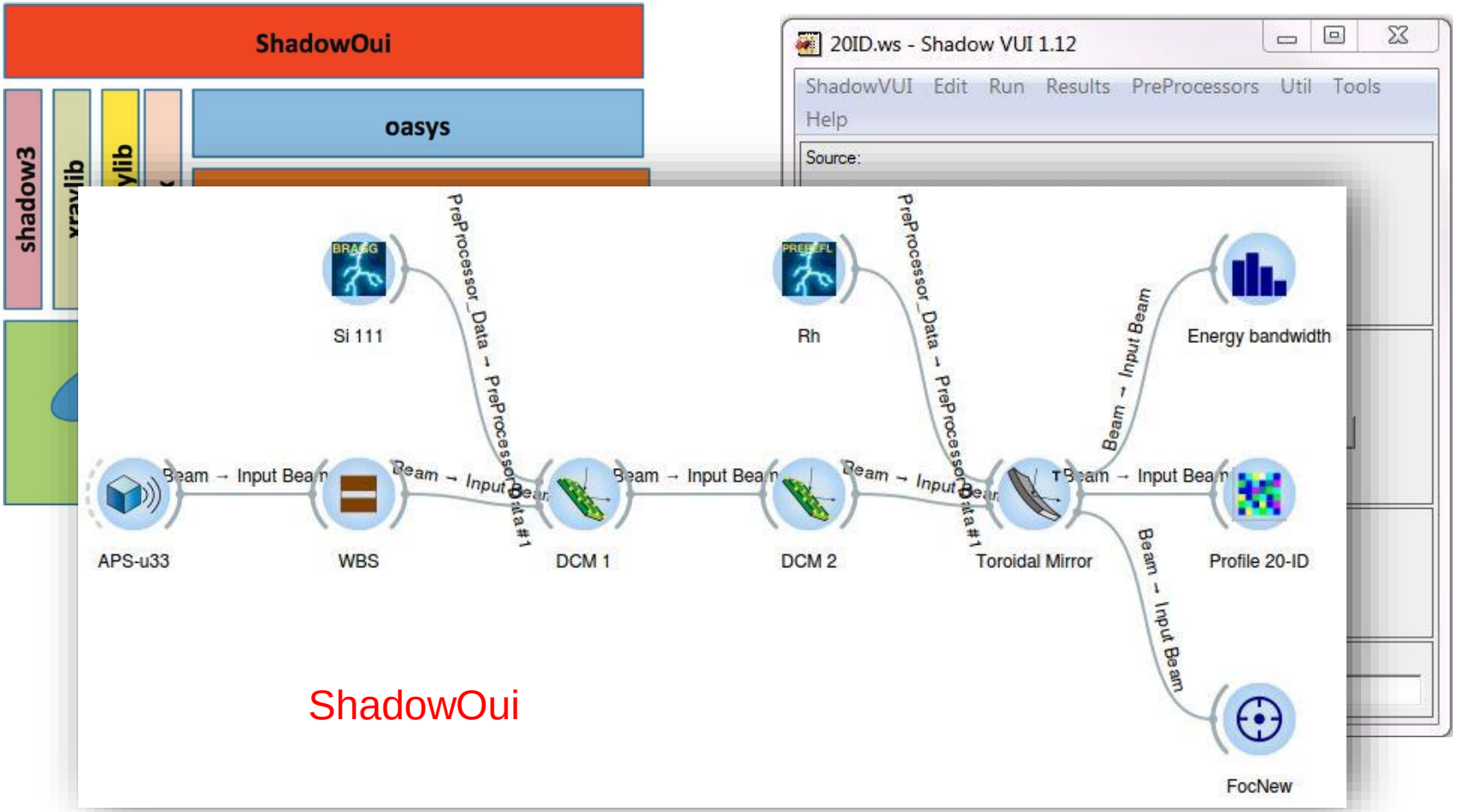


Rh.dat
Si111.dat
+

L. Rebuffi and M. Sánchez del Río, J. Synchrotron Radiat. 23, 1357 (2016).

SHADOWOUI

https://github.com/lucarebuffi/ShadowOui



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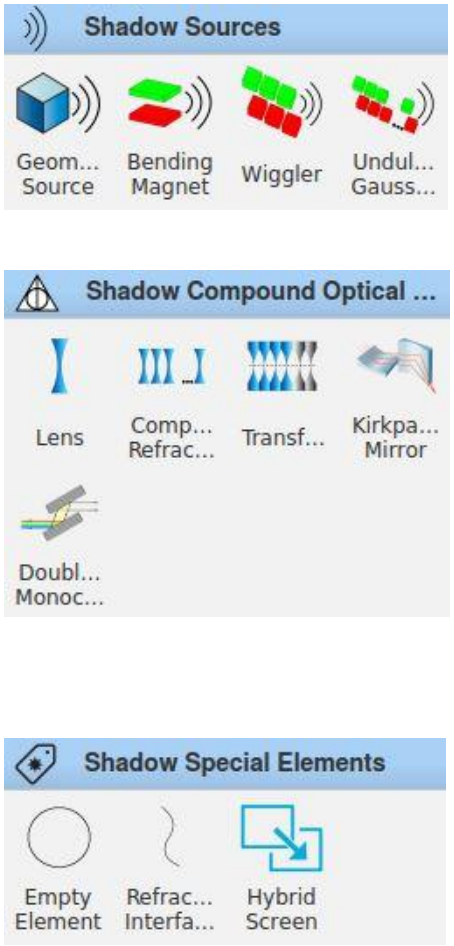
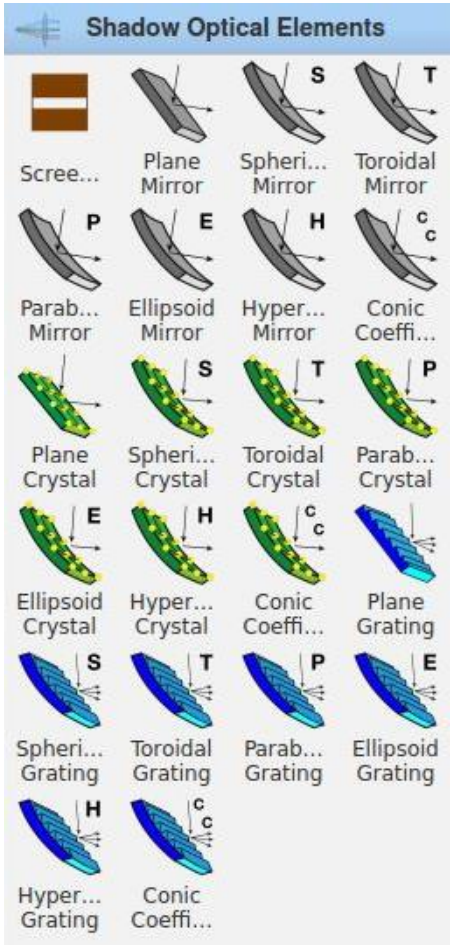
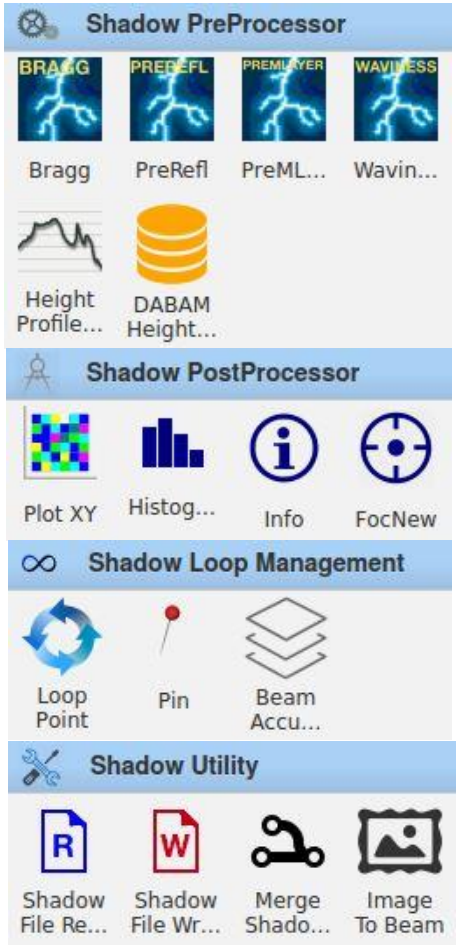
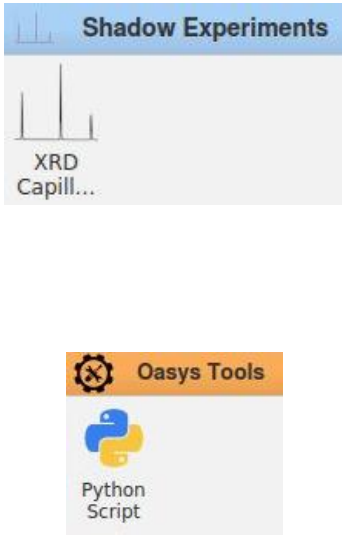
SHADOWOUI

Tutorial — https://github.com/srio/ShadowOui-Tutorial





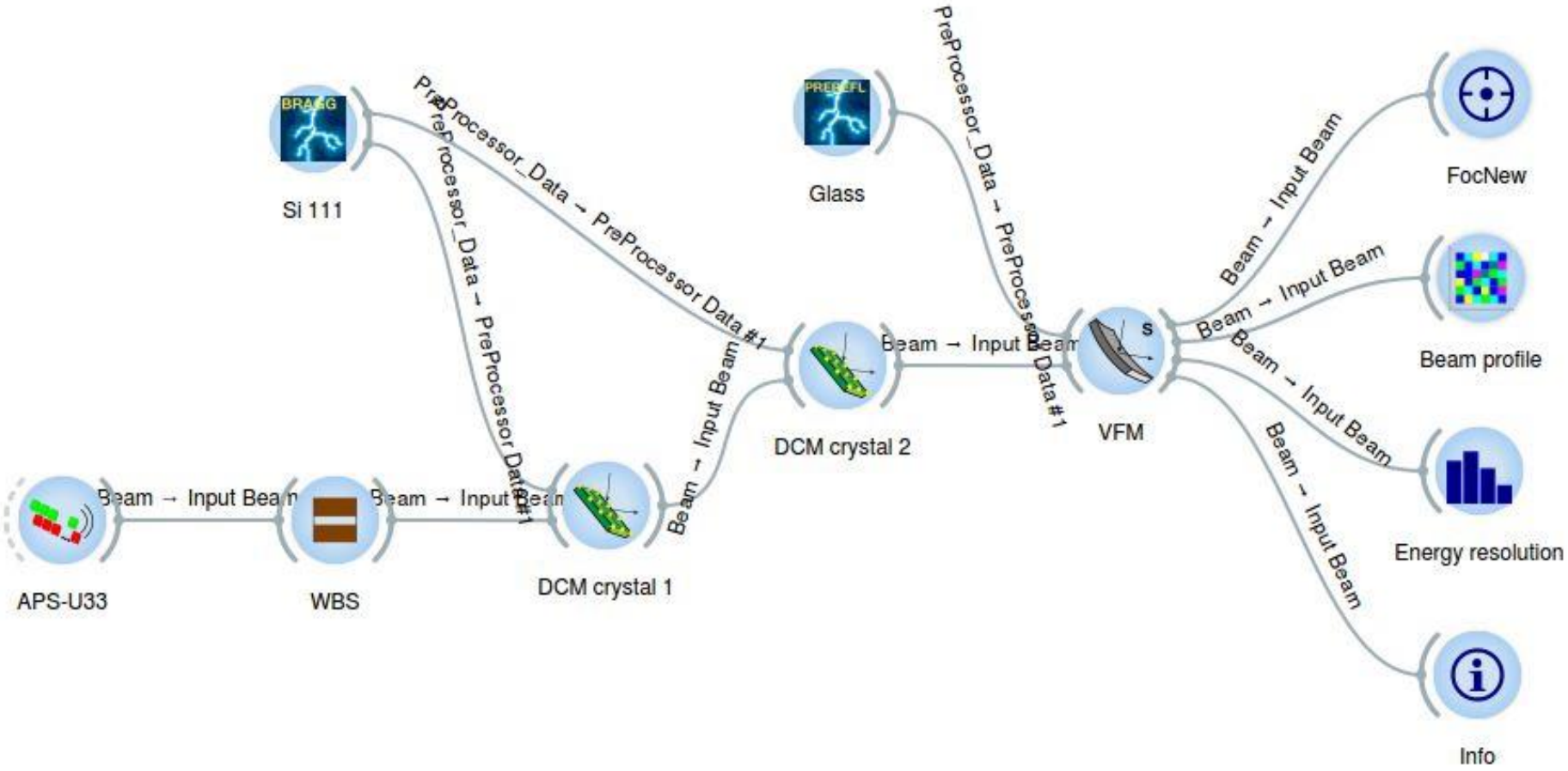




L. Rebuffi and M. Sánchez del Río, J. Synchrotron Radiat. 23, 1357 (2016).

SHADOWOUI

Demonstration



HYBRID METHOD

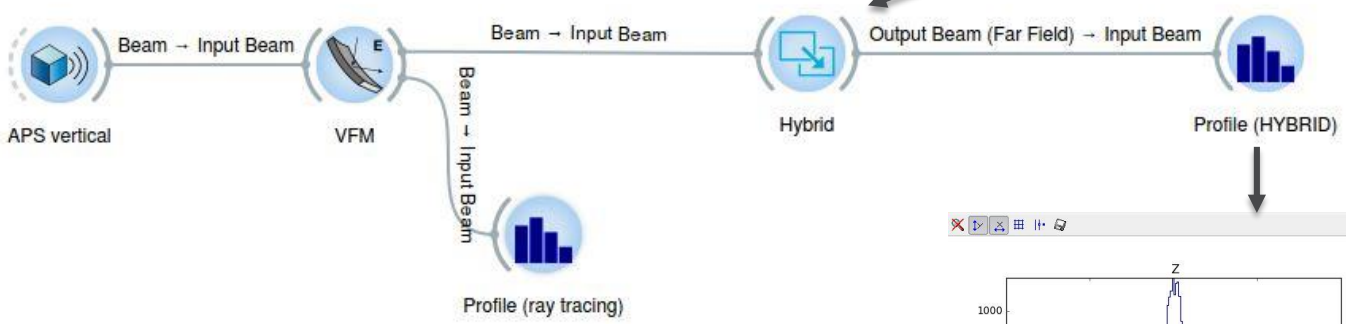
Developed at APS (https://www1.aps.anl.gov/Science/Scientific-Software/HYBRID)

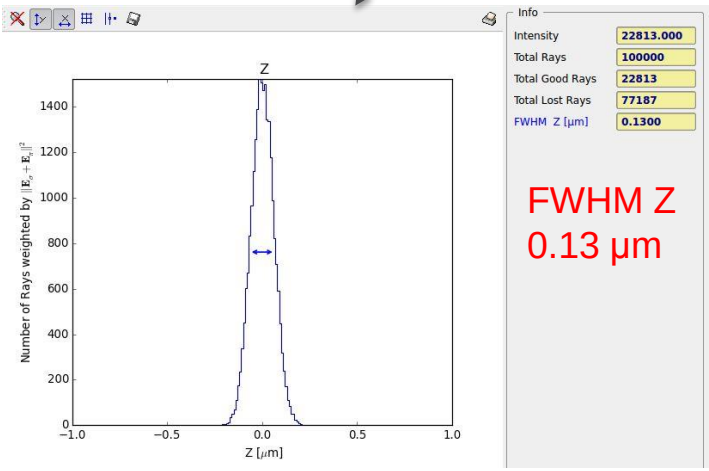
- Combining ray-tracing and wavefront propagation
  - Ray-tracing as the backbone
  - Add diffraction effect when beam is clipped by apertures and optics
  - Treat the optics figure error through the wavefront propagation
  - Partial coherence of the beam is dealt with by convolution (simplified)
- Apply to beamline design
  - Very efficient
  - Simulate beam profiles with reasonable accuracy
  - Help with the specification of the mirror surface quality
  - Needed for almost all APS-U new beamlines and some beamline upgrades
- Distribution
  - Implemented to both the XOP-ShadowVUI and OASYS-ShadowOui version.
  - Master version in Igor Pro.

X. Shi, et al., J. Synchrotron Rad. 21, 669 (2014).
X. Shi, et al., Proc. SPIE 9209, 920911 (2014).
X. Shi, et al., Proc. SPIE 9209, 920909 (2014).

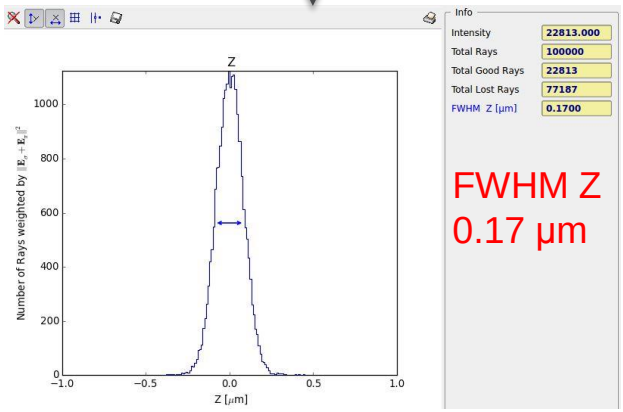
HYBRID METHOD

Distribution — OASYS-ShadowOui version



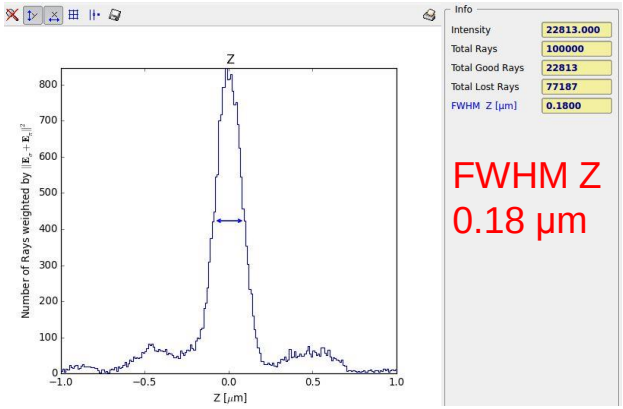


FWHM Z
0.13 μm



FWHM Z
0.17 μm

60 mm
ideal mirror

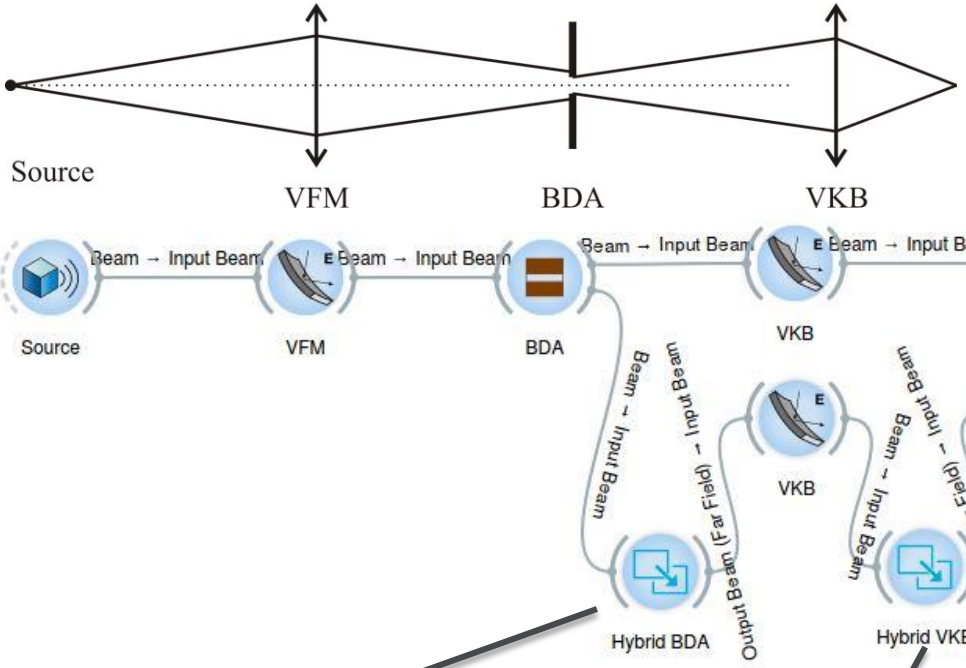


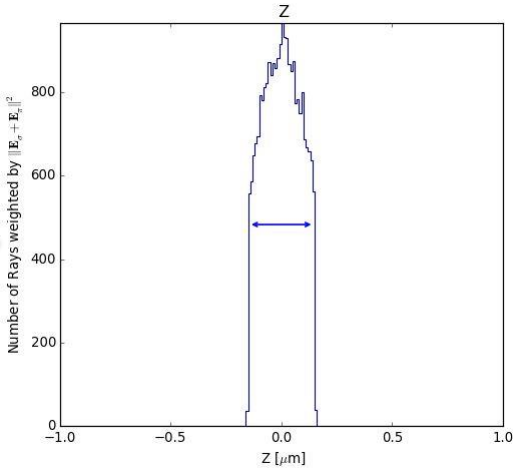
FWHM Z
0.18 μm

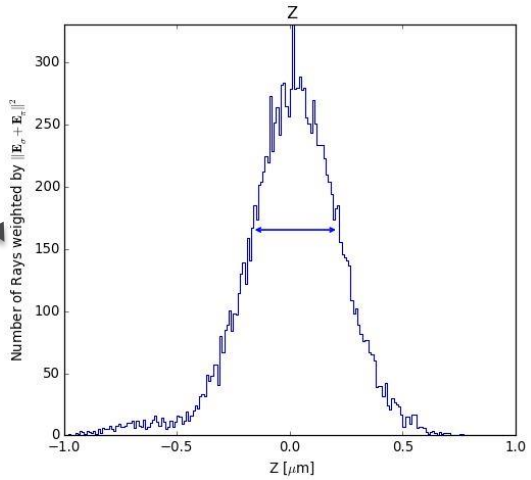
60 mm
mirror with
slope error

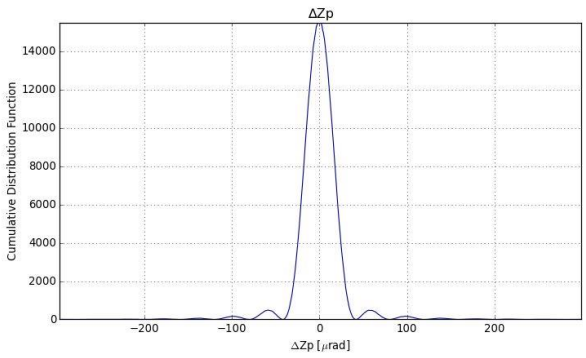
HYBRID METHOD

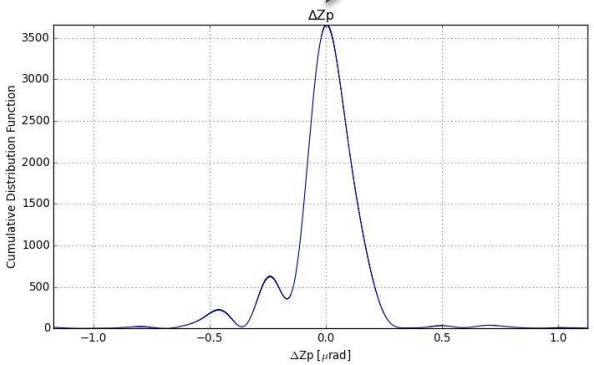
Distribution — OASYS-ShadowOui version











OASYS-SHADOWOUI TRAINING COURSE

Luca Rebuffi, Xianbo Shi, Ruben Reininger

- A one-day hands-on training during the week of Dec. 12-16, 2016.
- Contents
  - Extended introduction on OASYS and ShadowOui
  - ShadowOui tutorials
  - Practical section on simulating soft/hard x-ray beamlines, Hybrid
- Please try to install and play with it before the training section. Note that the installation from source on Linux may not be issue free.
- Use github to report issues and bugs.
  https://github.com/lucarebuffi/ShadowOui

THANK YOU!