Rigorous simulation of partially coherent waves from undulator to sample

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Content

Note: this presentation will not use slides but rather the web documentation of xrt

pythonhosted.org/xrt/

- xrt: ray tracing and wave propagation tool   ~1 min

- Undulator source   ~10 min

    - comparison with other codes at extremes

    - speed in single- and multiple-electron calculations

    - custom magnetic field

- Wave propagation   ~10 min

    - Kirchhoff integrals

    - tests with Laguerre-Gaussian beam

    - coherence signatures (Wigner function, mutual intensity, eigen modes)

- Summary

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Summary

xrt calculates undulator sources – reliably and quickly. Undulator source in xrt can have custom magnetic field.

xrt offers wave propagation that can be freely intermixed with ray tracing. xrt can work with fields with very complex wave fronts such as vortex (singular) waves.

The coherence properties can be analyzed by eigen mode decomposition (or PCA) of mutual intensity. This method gives a reliable evaluation of coherent fraction which is invariant of the screen position.