

# At-Wavelength Metrology and In-Situ Figuring (OFT)

## OFT at NSLS-II

- Enable fabrication of aspheric x-ray mirrors at sub-nm precision with efficient tailoring directly at SR facilities and their testing, performance verification
- Define state of the art optical metrology for conventional (diffractive/ reflective/ refractive) and crystal x-ray optics
- Provide flexible and easy configurable environment for x-ray radiometry, detector and instrumentation testing

## Examples of Science Areas & Impact

- TECHNOLOGY DEVELOPMENT: instrumentation for atomistic level surface figuring and measurements of crystal lattice constants (homogeneity) to  $10^{-7}$  precision
- MATERIAL SCIENCE: Defect free, ultra low stress diamond crystal, as a basis for novel optics and detectors for x-ray free electron laser facilities

## Beamline Capabilities

**SOURCE:** combination of dipole (soft x-ray) and 3PW (hard x-ray)

**ENERGY RANGE / RESOLUTION:** 1-15 keV overall, emphasizing 1 keV (soft) and 7 keV (hard)

**TECHNIQUE(S):** x-ray interferometry (point shearing (soft x-ray) and Talbot-type (hard x-ray)) and wave front sensing (Hartmann detector); x-ray reflectivity and scattering; white and monochromatic x-ray topography and high resolution diffractometry

**RESOLUTION:** wave front reconstruction at  $\sim 0.1$  nm precision and  $\sim 1 - 10$   $\mu\text{m}$  spatial resolution

