Total normalized transverse coherence from Young's double pinhole measurements at FLASH2

12.12.2018

definitions

transverse coherence length ξ_T, global degree of coherence ζ

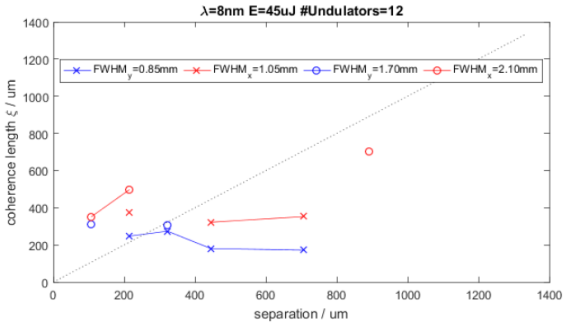
Within the framework of the Gaussian Schell model (GSM), which is widely used to describe synchrotron radiation from an undulator, the CDC and the intensity distribution of the X-ray beam are assumed to be Gaussian functions. In this case, a global degree of coherence can be introduced, which characterizes the transverse coherence properties of the beam by one number [13,21,22] A. Singer et al. 2012

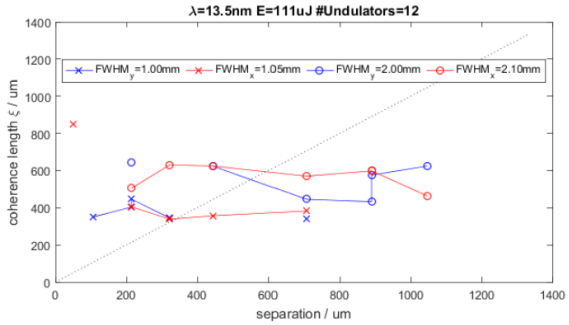
$$\zeta = \left(\frac{\xi_T}{\sigma_B}\right)\left[4 + \left(\frac{\xi_T}{\sigma_B}\right)^2\right]^{-1/2}$$

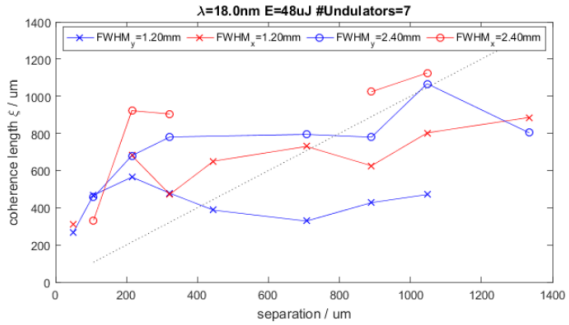
ξ_T is the transverse coherence length defined as the root mean square (rms) width of the CDC and σ_B is the rms width of the beam intensity distribution. ζ varies from zero for incoherent to one for coherent radiation.

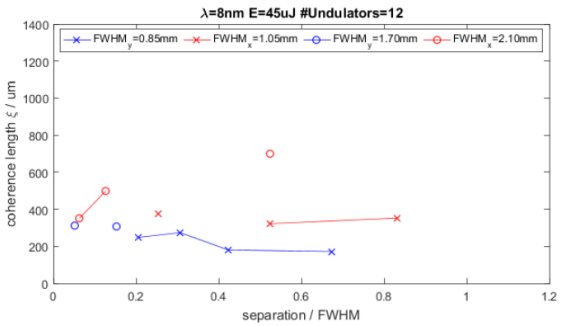
(from Bagschik et al. 2016, eq.5)

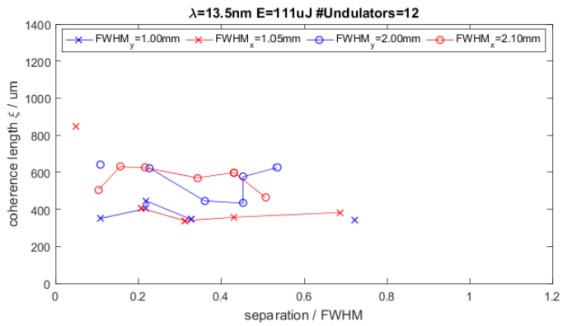
“Coherence length” \xi and “normalized degree of coherence” \zeta vs. slit separation for wavelengths of 8, 13.5 and 18nm

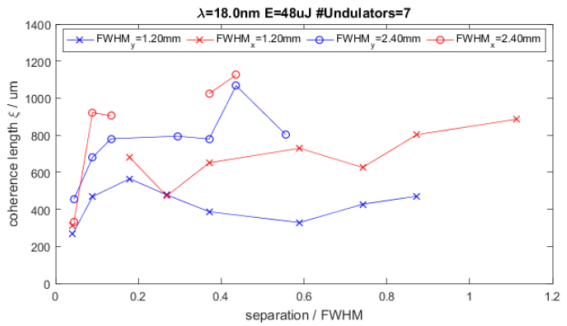


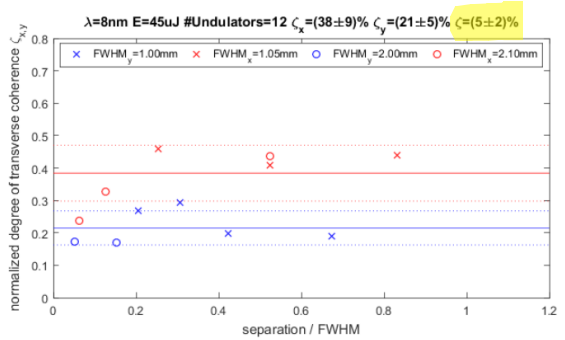


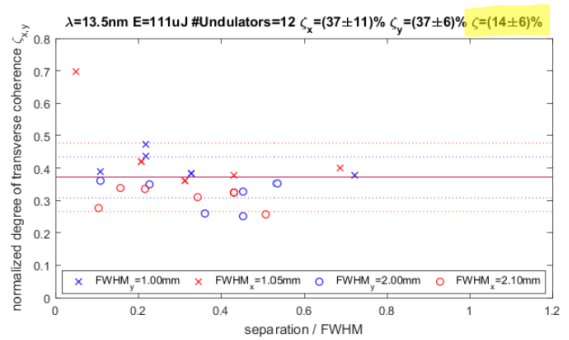


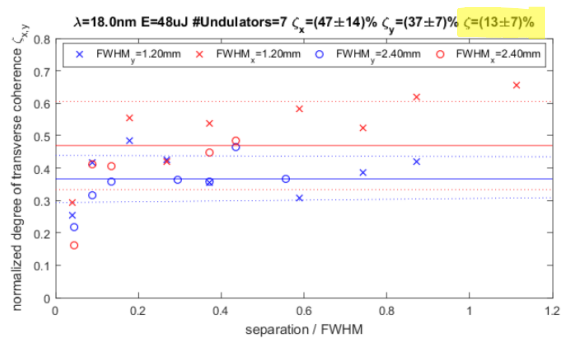












Total normalized degree of coherence vs. wavelength