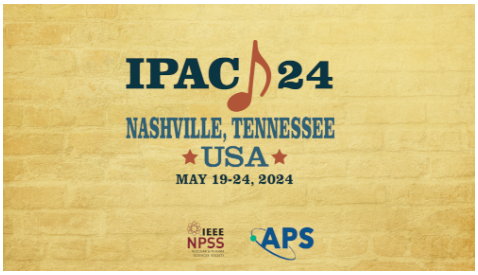

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VUV diagnostics for oscillator FEL operation from 200 nm to 155 nm

Monday, 20 May 2024 16:00 (2 hours)

Powered by a storage ring with energies ranging from 240 MeV to 1.2 GeV, the Duke Free-Electron Laser (FEL) has demonstrated operation across a broad wavelength spectrum from infrared (IR) to vacuum ultraviolet (VUV): 1100 nm to 170 nm. This FEL serves as a photon source for the High Intensity Gamma-ray Source (HIGS), producing polarized, near-monochromatic, and high-flux Compton gamma-ray beams in an extensive energy range from 1 MeV to 120 MeV, with the highest flux recorded at 3.5e+10 ph/s (total) around 10 MeV. To generate high-energy gamma-ray beams above 80 MeV, the FEL must operate in the VUV region from 195 nm to 155 nm. This work describes the development and operation of VUV beam diagnostics within a nitrogen-purged enclosure, with increased difficulty as the wavelength shortens towards 155 nm. We will discuss the challenges encountered and the solutions found for VUV beam diagnostics, leading to the successful FEL lasing in the VUV region.

Footnotes

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