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## FEL Lasing Below 170 nm Using an Oscillator

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While the linac based single-pass FEL has been successfully operated in the EUV and x-ray regions for about two decades, the oscillator FEL has been limited to operating in the longer wavelength region due to the limitation of high-reflectivity, thermally stable, and radiation-resistant short-wavelength mirrors. With Duke storage ring FEL, we have recently extended the shortest lasing wavelength of the oscillator FEL to 168.6 nm. We have demonstrated lasing wavelength tuning from 168.6 to 179.7 nm with excellent beam stability. This progress has been made possible by developing a new FEL configuration with substantially reduced undulator harmonic radiation on the FEL mirror, a thermally stable FEL optical cavity, and a new type of high-reflectivity fluoride-based multilayer coating with a protective capping layer. Employing this VUV FEL in Compton scattering, we have also produced the first 120 MeV gamma rays at the High Intensity Gamma-ray Source (HIGS).

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Yes

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