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Echo-enabled harmonic generation at FERMI FEL-1: commissioning and initial user experience

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The FERMI free-electron laser (FEL) facility has recently achieved a significant milestone with the successful implementation of the echo-enabled harmonic generation (EEHG) scheme in the FEL-1 amplifier line. This advancement is part of a broader upgrade strategy aiming at expanding the covered spectral range of the facility to the entire water window and beyond. Through this upgrade, the maximum photon energy of FEL-1 has been doubled and spectral quality has been enhanced. The updated FERMI FEL-1 is the first user facility operating in the spectral range 20-10 nm utilizing the EEHG scheme. It will serve also as the ideal test bench for conducting new machine studies in the perspective of future developments. In this contribution, we present the results obtained during the commissioning phase and the first user experiments.

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