

Direct Observation of Beam Bunching Produced by a High Gain Microwave Free Electron Laser,
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CEA/CESTA - We present the first direct observation of electron beam bunching produced by a high gain Free Electron Laser interaction (FEL). This work is performed to study the feasibility of producing the drive beam of a two beam accelerator¹. The FEL uses an induction linac which delivers a 1 kA electron beam at 2.2 MeV. The beam interacts in a helical wiggler with a 35 GHz input wave which is amplified to a ten of megawatts. Optical measurements clearly show beam bunching which occurs at the FEL frequency. The evolution of bunches as a function of experimental parameters is given. In particular we study debunching along the beam propagation axis.

1 This experiment is performed in collaboration with the CLIC group at CERN.