

RF Gun Operation with Alternating RF Pulse Structure (Pulses inside the Pulse Mode)

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The Free-Electron Laser in Hamburg (FLASH) is a user facility since 2005, delivering femtosecond short radiation pulses in the wavelength range between 4.1 and 44 nm using the SASE principle. In FLASH, the electron beam is accelerated to 1.25 GeV with L-band superconducting cavities. The electron source is a normal conducting RF-gun photoinjector. The L-band standing wave RF gun has one and a half cells. The gun is operated in burst mode with an RF pulse length of up to 900 microseconds and a repetition rate of 10 Hz. Several hundreds to thousands of bunches are accelerated per second. With 5 MW of pulsed forward power, the dissipated power inside the RF gun is 45 kW. We are proposing an operational mode which allows us to reduce the dissipated power to ease operation or to increase the effective duty cycle in the gun by pulsing the gun within one burst. We report on first experimental results at FLASH.

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