

Status of the L-band gun development at PITZ

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Gun5, the new generation of high-gradient normal conducting 1.3 GHz RF guns for linac driven free-electron lasers like FLASH and European XFEL is under development at the Photo Injector Test facility at DESY in Zeuthen (PITZ). Its improved cell geometry and cooling concept allow for RF pulse durations of up to 1 ms at 10 Hz repetition rate, at gradients of ~ 60 MV/m at the cathode. Gun5 is also equipped with an RF probe for measurements of the RF field inside the gun.

The first gun of this type, Gun5.1, is in operation at PITZ since April 2022. Gun5.2 will be commissioned at the FALCO conditioning facility at DESY in Hamburg, starting in June 2024. This gun is equipped with a balanced (symmetric) RF waveguide feed to the coaxial power coupler to prevent a coupler kick and thus improve the beam quality delivered by the electron source.

Further guns are currently in the manufacturing process. In parallel, studies towards a more reliable cathode spring design are ongoing, in order to overcome observed issues during the high duty cycle operation of Gun5.1. This article will give an overview on all those developments.

Footnotes

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