

PITZ Optimization at SRF Gun Gradients

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A continuous wave (CW) mode operation of the European XFEL is under studies for a future upgrade. A superconducting RF (SRF) CW gun is under experimental development at DESY in Hamburg. Beam dynamics simulations for this setup have been done assuming 100 pC bunch charge and a maximum electric field at the photocathode of 30-40 MV/m. Experimental studies for these parameters using a normal conducting RF gun have been performed at the Photo Injector Test facility at DESY in Zeuthen (PITZ) together with corresponding beam dynamics simulations. The beam transverse emittance was minimized by optimizing the main photo injector parameters in order to demonstrate the feasibility of generating electron beams with a beam quality required for successful CW operation of the European XFEL for conditions similar to the SRF gun setup.

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