

Speed Poster: Improved beam-based method for RF photo gun stability measurements

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Stable and reliable operation of a high brightness photo injector is one of main challenges for the electron source of modern linac based Free Electron Lasers (FELs). The Photo Injector Test facility at DESY in Zeuthen (PITZ) develops high brightness photo injector for FLASH and the European XFEL. RF photo gun stability and reliability is in the focus of experimental program at PITZ. In November 2014 a new uTCA based LLRF system has been implemented at PITZ. This implies possibility to improve the stability of the gun phase and amplitude. Another important factor for the stable operation is a precise control of the gun cavity temperature. Several improvements have recently been implemented in the gun water cooling system (WCS). A method to estimate the RF gun stability based on electron beam measurements has been improved, adjusted to PITZ conditions and applied to monitor the stability of the photo injector. Besides the rms RF gun phase jitter it delivers also photocathode laser pulse energy fluctuations as well as estimations on electronic noise of the used measuring device. Results of these measurements for various regimes of the gun WCS and LLRF settings will be presented in comparison to direct uTCA measurements.

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