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Realization of a multi-channel high resolution optical system at PITZ

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The Photo Injector Test facility at DESY Zeuthen site, (PITZ) develops and characterizes high brightness electron sources for short wavelength Free-Electron Laser (FEL) facilities like FLASH and the European XFEL. An optimization of the photo injector is only possible with high resolution diagnostics. Therefore, a variety of beam diagnostics is being developed and implemented. The complex optical system at PITZ is supporting diagnostic techniques for measuring the electron bunch length and the longitudinal phase space using a streak camera.

Considerations on a reflective optical system design will be discussed in the context of beam instrumentation and constraints given by the high-radiation environment. The main goal of this study focuses on a design proposal of an optical system with high temporal resolution of less than 1ps which will transfer the optical signals of the Cherenkov radiation or optical transition radiation (OTR) from various screen stations to the streak camera, with minimum angular and temporal dispersions. The determination results of the multi-channel optical system at PITZ, which provide maximum collection efficiency, will realize in several stages to cover a distance of 27 m. The optical model was implemented using a complex ray tracing program. The methodical investigations for the design process will be shown as well for system performances especially concerning transversal optical resolution and time dispersion.

Biography

Haider M Al-Juboori has completed his PhD at the age of 26 years from Optoelectronics and Laser Engineering, College of Engineering, Al-Nahrain University and Postdoctoral studies from DESY (Deutsches Elektronen-Synchrotron) and DLR (Deutsches Zentrum für Luft- und Raumfahrt). He has published more than 10 papers in reputed journals and has been serving as an editorial board member of repute.

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