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A new RF-contact spring mechanism for exchangeable cathodes in high brightness guns at DESY

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A new 5th generation normal conducting electron gun with improved cell geometry and cooling concept for RF pulse durations of up to 1 ms at 10 Hz repetition rate, and gradients of ˜60 MV/m at the cathode was developed and is being tested at the Photo Injector Test Facility at DESY in Zeuthen (PITZ). The cathode is inserted into the back wall of the gun cavity via a load lock system and a RF contact spring connects the cathode to the gun. In order to ensure reliable high gradient operation at such long pulse durations, a new RF contact spring mechanism for the exchangeable photo cathode plug was developed. The novel spring mechanism was integrated into the mechanical constraints given by the existing Gun5 design and is compatible with the standard cathode plugs. The new spring increases the number of contact points, shortens the path length of the RF currents and improves the spatial distribution of the contacts over the full circumference of the cathode plug. A new preloading mechanism allows to insert the cathode plug while the spring is unloaded and thus reduce friction and particle generation close to the RF cavitiy.

Footnotes

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