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Design and commissioning of a 200-kV photocathode electron gun

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Ultrashort electron beams with high brightness are of vital significance in probing nanoscopic dynamics on the pico-to-femtosecond temporal scales. Electron sources are the most critical element in such apparatuses, whose advancements are expected to further improve the resolving capabilities. In this contribution, we report on the development of a DC photocathode electron gun aiming at delivering optimal-quality electron beams for ultrafast electron scattering and photocathode studies. The 200 kV gun features simplicity and adjustability in fabrication and assembling, and is compatible with INFN/DESY/LBNL-type photocathode plugs. The design, fabrication and conditioning processes of the gun are discussed in detail, along with preliminary beam measurement results where nm-scale emittance is demonstrated.

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Footnotes

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