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Optimization Studies On An S-band RF Gun For MeV-Ultrafast Electron Diffraction

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MeV-ultrafast electron diffraction (MeV-UED) has enabled broad scientific opportunities for the studies of structural dynamics, ultrafast chemical processes and coupling of electronic and atomic motions in a variety of gas, liquid and solid state systems. The growing demand of future scientific needs calls for relativistic electron probes with ultra-short bunch length(10 fs) and ultra-low normalized emittance(2 nm). A high brightness, low emittance electron source is required for this purpose. Here, we present optimization studies on a 2.86 GHz S-band RF gun for MeV-UED applications. Gun modeling, beam dynamics simulations and multi-objective genetic algorithm (MOGA) optimizations will be described. Performance with different cell lengths, gun phases and pulse charges will be presented.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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