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Design of a New Beamline for the ORGAD Hybrid RF-Gun at Ariel University

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The ORGAD Hybrid RF-gun which was commissioned in Ariel University is based on a smaller-scale prototype built at UCLA's Particle Beam Physics Laboratory (PBPL) as an on-going collaboration between the Universities. The main beamline of the hybrid S-band (2856 [MHz]) photo injector is currently driving a 150[kW], short pulse THz-FEL. In order to use the RF gun for other applications, a new and independent beam line is required. The secondary beamline is only feasible with the design of a dispersive beam-line dogleg section. High quality of the secondary beam is crucial for the designated applications such as Ultra-fast Electron Diffraction (UED). We present full 3D GPT (General Particle Tracer) simulations of this secondary beamline in which we manipulate the beam, compress the beam and maintain beam emittance and pulse duration. An optimization procedure of the design was performed to reconstruct the electron beam quality parameters after passing through the dispersive dogleg section. The optimization procedure is based on transfer matrices and simulations using realistic field-maps and fringe fields of the quadrupoles which were designed in-house, and their 3D field maps were exported using CST (Computer Simulation Technology). We present the optimization results with the improved beam quality.

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Yes

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