

WARP and ImpactT Simulations on Structured Electron Beams from Nano-engineered Cathodes

WARP framework has promising extensive features for particle-in-cell simulations. Thus, simulations of the early-stage beam dynamics of the emission process from nano-engineered cathodes was carried out via WARP framework with our implementation of multi-photon-emission and field-emission process. Structured electron beams, emitted from such cathodes without azimuthal symmetries, require 3D-solver. Cathode-to-front-end beam dynamics, therefore, were simulated by using ImpactT with either 3D-solver or point-to-point N-body space charge solver. We explore the imaging of cathode pattern after acceleration and manipulation with focusing quadrupoles.

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