

PAC09 Abstract

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Title Parallel 3D Finite Element
Particle-In-Cell Simulations with
Pic3P

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Abstract SLAC's Advanced Computations Department (ACD) has developed the parallel 3D Finite Element electromagnetic Particle-In-Cell code Pic3P. Designed for simulations of beam-cavity interactions dominated by space charge effects, Pic3P solves the complete set of Maxwell's equations self-consistently and includes space-charge, retardation and boundary effects from first principles. Higher-order Finite Element methods with adaptive refinement on conformal unstructured meshes lead to highly efficient use of computational resources. Massively parallel processing with dynamic load balancing enables large-scale modeling of photoinjectors with unprecedented accuracy, aiding the design and operation of next-generation accelerator facilities. Applications include the LCLS photoinjector and the ILC Polarized SRF Gun.

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Footnote

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