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Application of the nonlinear material solver in the ACE3P electromagnetic code suite

Wednesday 4 June 2025 16:00 (2 hours)

SLAC has been developing the parallel finite element electromagnetics simulation suite ACE3P (Advanced Computational Electromagnetics 3D Parallel) for accelerator modeling using high performance computing (HPC) platforms. In this work we present the current status of the development of the nonlinear EM solver, in ACE3P which includes nonlinear material with application to quantum nonlinear photonics. This utilizes parallel and scalable architecture to perform simulations on multiscale optical and quantum systems. We show examples of harmonic generation, and parametric interaction essential for THz generation. Also we show examples of using this code to design novel THz nonlinear deflecting structures used for developing a sub0femotosecon timing diagnostics for UED beamlines.

Footnotes

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