CASUS
CENTER FOR ADVANCED SYSTEMS UNDERSTANDING

CASUS Seminar on Numerical Techniques and Algorithms

Solving Maxwell's equations in particle-in-cell simulations

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Date: Thursday, 17 September 2020

Time: 10:00 – 12:00 CET

Location: CASUS Lecture Room, Görlitz

Abstract:

Particle-in-cell (PIC) simulations solve the dynamics of particles and electromagnetic fields by advancing particle and field equations of motion in time steps. The field solver, which advances the electromagnetic fields by solving Maxwell's equations, is one of several stages within the PIC cycle. The talk will introduce the classic finite-difference time-domain method developed by Yee, which is most commonly employed in field solvers. Further methods, such as arbitrary-order FDTD or pseudo-spectral time-domain methods, are presented and their advantages and drawbacks with respect to dispersion properties or domain decomposition discussed