

Abstract Submitted  
for the DPP07 Meeting of  
The American Physical Society

**PARSEK: a Parallel Software Package for Implicit Particle-in-Cell Simulations** STEFANO MARKIDIS, GIOVANNI LAPENTA, ENRICO CAMPOREALE — A C++ software package, called PARSEK, for Particle-in-Cell(PIC) plasma simulations on parallel computers is presented. PARSEK computational engine is based on the fully implicit solution of discretized three dimensional Maxwell's equations and particle equation of motion. The implicit method allows to describe effectively low-frequency plasma phenomena without paying the severe restrictions of explicit numerical schemes on simulation time steps and grid spacing. The fully implicit PIC method is now developed on parallel computer architecture. With implicit numerical schemes and parallel software architecture, PARSEK extends considerably time and space scale domains of PIC simulations. PARSEK software components, with emphasis on the development of the implicit PIC method on parallel computers, and a suite of applications, such as magnetic reconnection and relativistic streaming instabilities, are described.

Stefano Markidis  
University Of Illinois at Urbana-Champaign

Date submitted: 18 Jul 2007

Electronic form version 1.4