Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

New features in OSIRIS 2.0 R.A. FONSECA, DCTI, Instituto Superior de Ciências do Trabalho e da Empresa, Lisboa, Portugal, S.F. MARTINS, P. ABREU, J. MARTINS, F. FIÚZA, J. VIEIRA, L.O. SILVA, GoLP/Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Lisboa, Portugal, V. DECYK, F. TSUNG, J. TONGE, W.B. MORI, UCLA Plasma Simulation Group, CA 90095 — OSIRIS 2.0 [1] is a state of the art, fully relativistic massively parallel particle in cell code, that is widely used in kinetic plasma modeling for many astrophysical and laboratory scenarios. We report on the new developments done in the code, focusing on the new high performance vector SIMD code (Altivec/SSE3) for single precision calculations, detailing performance and floating point efficiency, and also parallel I/O for diagnostics, allowing for higher performance and scalability on HPC systems. We will also describe the new numerical precision features in the code, and we will also present the new algorithms incorporated into the code, in terms of field solver (4^{th} order Yee solver, etc.), new filtering techniques, perfectly matched layers (PML) boundary conditions, and boosted frame simulations. Finally, we also report on a new diagnostic tool to calculate the radiation produced with wavelengths below the simulation grid resolution.

[1] R. A. Fonseca et al., LNCS 2331, 342, (2002)

Luis Silva
GoLP/Instituto de Plasmas e Fusão Nuclear,
Instituto Superior Técnico, Lisboa, Portugal

Date submitted: 22 Jul 2009 Electronic form version 1.4