

Abstract Submitted  
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**New developments in the OSIRIS 4.0 framework**<sup>1</sup> RICARDO FONSECA, ISCTE - Instituto Universitário de Lisboa, Portugal, T. DALICHAOUCH, UCLA, A. DAVIDSON, U.S. Naval Research Laboratory, F. CRUZ, F. DEL GAUDIO, G. INCHINGOLO, A. HELM, Instituto Superior Técnico, Lisboa, Portugal, R. LEE, F. LI, J. MAY, K. MILLER, UCLA, K. SCHOEFFLER, Instituto Superior Técnico, Lisboa, Portugal, A. TABLEMAN, H. WEN, X. XU, UCLA, F.S. TSUNG, J. VIEIRA, M. VRANIC, T. GRISMAYER, Instituto Superior Técnico, Lisboa, Portugal, V.K. DECYK, W.B. MORI, UCLA, L.O. SILVA, Instituto Superior Técnico, Lisboa, Portugal — The OSIRIS [1] Electromagnetic particle-in-cell (EM-PIC) code is widely used in the numerical modeling of many kinetic plasma laboratory and astrophysical scenarios. In this work, we report on the new developments recently introduced into the framework. In particular, we will describe our implementation of a tile-based dynamic load balancing algorithm, and the support for the latest hardware (new GPU architectures / ARM Neon). We will focus on the use of a customized field solver used to mitigate NCI, and provide better accuracy under extreme fields. We will also address the new particle beam initialization capabilities and new EMF sources available. Finally, we will discuss our new diagnostic i/o subsystem that provides order of magnitude performance improvements over the existing HDF5 implementation. [1] R. A. Fonseca et al., Lecture Notes in Computer Science **2331**, 342-351 (2002)

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