Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Integrated simulations of tokamak physics using the FACETS framework AMMAR HAKIM, J. CARY, J. CARLSSON, Tech-X Corporation, S. KRUGER, Texh-X Corporation, MIAH, S. VADLAMANI, Tech-X Corporation, A. PANKIN, Lehigh University, J. LARSON, L. MCINNES, ANL, J. CANDY, General Atomics, T. RONGLIEN, T. EPPERLY, R. COHEN, LLNL, M. FAHEY, J. KUEHN, P. WORLEY, ORNL, A. MALONY, S. SHINDE, Paratools Inc, E. FEINBUSH, G.W. INDIRESHKUMAR, C. INDIRESHKUMAR, C. LUDESCHER, L. RNADERSON, D. MCCUNE, PPPL, A. YU. PIGAROV, Univ. of California at San Diego — The FACETS project aims to provide a framework for whole-device simulations of tokamaks. FACETS not only provides infrastructure for developing new physics components but also provides mechanisms for integration and tight coupling of existing components to perform whole-device simulations. In this poster we review the software infrastructure of FACETS and also present results from coupled simulations with core, edge and wall components integrated into FACETS. The core component, FACETS::core, solves core transport equations in the tokamak core. FACETS::core uses the GLF23 model to compute turbulent fluxes at each flux surface and advances the transport equations in time using an nonlinear multigrid scheme. FACETS::core achieves significant speed ups, on the order of 100x to 200x, when compared to the ASTRA core solver. This speedup is achieved using a combination of implicit solvers and flux computations performed in parallel. For the edge computations the UEDGE code is used.

Ammar Hakim
Tech-X Corporation

Date submitted: 25 Jul 2008 Electronic form version 1.4