Abstract Submitted
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SIESTA: an Scalable Island Equilibrium Solver for Toroidal Applications[1] RAUL SANCHEZ, STEVEN HIRSHMAN, VICKIE LYNCH, Oak Ridge National Laboratory — The construction and development of a new ideal MHD 3D-equilibrium solver, capable of dealing with magnetic islands and stochastic regions in a fast, accurate and scalable manner will be described. The SIESTA code will complement other existent 3D MHD island solvers and is particularly suited for applications that require not only accuracy but speed of evaluation as well, such as experimental 3D equilibrium reconstruction or stellarator design. SIESTA will also be useful to calculate MHD equilibria at very high spatial resolutions, such as those that might be required for the investigation of NTMs at ITER-relevant temperature and resistivity conditions. SIESTA is based on a preconditioned, iterative algorithm that takes advantage of a pre-existent VMEC solution to provide both a background coordinate system that guarantees a compact representation as well as a good initial guess for the iterative procedure. Details of the algorithm implementation, its performance on some simple test problems and initial steps towards its porting to a massively parallel environment will be discussed.

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Raul Sanchez
Oak Ridge National Laboratory

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