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Linux Parallel Gyrokinetic Solve[1] J. CANDY, R.E. WALTZ, F.L. HINTON, M.N. ROSENBLUTH, General Atomics — Results from a parallel, full-radius, electromagnetic, gyrokinetic solver are detailed. Passing electron motion, required for electromagnetic perturbations, is fully retained, and all linear terms are advanced implicitly. Our goal is to elucidate the role of profile effects in the generation of high-n turbulence and transport in tokamaks, using a formalism free of uncertainties related to fluid closures, particle noise, and the restriction to electrostatic perturbations. The solver has a variety of operational modes: (i) ballooning, with (r, θ) mapped to a one-dimensional extended angle; (ii) full-radius toroidal wedge; (iii) full-radius torus. Mode (i) allows comparison with existing linear flux-tube codes by piecewise-reconstruction of the ballooning mode from the real-space soluton. Case (ii) considers modes $n = n_0 + i\,\Delta n$, for $i = 1, \ldots, i_{\max}$ and $\Delta n \sim 10$, allowing the study of profile shear effects while minimizing computation and storage requirements. Case (iii) is the most general operation mode, relevant to low-n MHD effects on turbulent transport. (Linux SMP). Total system RAM is 4 Gb (distributed). Data communication is handled by switched fast ethernet using TCP/IP, with MPI at the application layer.

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Special instructions: immediately following R.E. Waltz

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