GPS11-17-04

Minutes for the GPSC meeting at APS/DPP 2004:

Attendents: L. Chen, Y. Chen, Decyk, Diamond, Eckstrand, Ethier, Hahm, Lee, Lewandowski, Lin, Manickam, Nazikian, Nishimura, Rewoldt, Parker, Wang, Jenkins, and Bateman (for Kritz).

* Upcoming meeting will be held in Irvine for the week of Feb. 21, 2005.

* GTC team :
1. A MPI version of GTC is deposited in CVS to expedite team coding.
2. An Object Oriented version of GTC will be initiated (Lin, Decyk et al.).
3. Poisson solver finite element interface with PETSc is completed (Nishimura, Adams). [A paper on the finite-element solver for GTC has been submitted to JCP (Nishimura et al.)].
4. General geometry version of GTC for shaped plasmas has been developed with a number of extended and generalized features. Linear and nonlinear ITG simulations of DIIID plasmas have been initiated with satisfactory results. Carefully nonlinear benchmark is ongoing.
5. ITG modes with non-adiabatic electrons using GTC based on split-weight (Lewandowski) and hybrid (Lin and Nishimura) are now available for comparisons and EM hybrid is in progress (Nishimura).
6. The work on ETG modes have been reported in IAEA and APS meetings (Lin, Chen and Hahm).
7. The effects of ion velocity-space nonlinearity on ITG modes have been reported at APS meeting (Lee et al.). More diagnostics are needed for the ITG runs with the velocity-space nonlinearity and for theoretical comparisons (Lee, Ethier).
8. 3.7 Teraflop/s with 2048 processors has been achieved on the Earth Simulator Computer in Japan with GTC (Ethier).
9. Movies of particle diffusion patterns from GTC yielded some interesting physical insight (Klasky).

* GEM team
1. GEM with general geometry is now ready for benchmarking with GTC.
2. GEM and GYRO comparisons for finite-beta physics are ongoing.
3. GEM now has full functionality of GYRO and is fully operational.
   - radial variation of all equilibrium quantitites
   - equilibrium Er shear
   - general magnetic equilibrium
4. A 2D domain decomp is now operational.
5. A paper on "Collisionless and semi-collisional tearing mode simulations" by Wan et al. has been accepted by PoP. Nonlinear island growth and saturation are observed and compared with exisiting theories.

* Theory/Experiments team:
1. Physics and simulation of ITG turbulence spreading have been reported in IAEA and ITPA meetings (Hahm, Lin, Rewoldt)
2. Exercising the radial electric field inclusion capability in GTC is a short term priority in addressing physics of turbulence spreading in the presence of transport barriers.
3. Need more diagnostics for GTC runs with velocity-space nonlinearity to improve physics understanding (Diamond).
4. GTC-Neo results on poloidal rotation in the presence of sharp gradients in pressure and toroidal rotation have been presented at IAEA meeting (Wang).

* Advisory Committee: Additional possible candidates were discussed.

* The use of GTC for core-edge integrated simulation inside the separatrix was discussed.

* GPSC website (http://w3.pppl.gov/theory/GPSC.html) is up and running. Please provide us with the links and other relevant information to Shannon.