Progress on Parallel Electron Kinetic Closures in NIMROD

E. D. Held
eheld@cc.usu.edu

Utah State University
Slab test case with secondary island
CEL evolution of n=0 with $T_e = 100 \text{ eV}$
Diffusive evolution of $n=0$ with $\kappa_\parallel = 6 \times 10^6$
CEL evolution of $n=1$ with $T_e = 100$ eV
Diffusive evolution of $n=1$ with $\kappa_\parallel = 6 \times 10^6$
Restart of NTM case 86144 with $S = 10^7$

- Restart simulation when energy in 3/2 mode is greatest.
Use 64 X 16 grid with 16 nodes on SP3

Turn on kinetic, parallel “electron" heat flow calculation with $T_e = 0.1 \text{ keV}$ and $1.0 \text{ keV}$. 
Current status of NTM with parallel electron heat flow

- Cut timestep to $10^{-7}$ and set $\text{tol} = 10^{-10}$.
- Stable evolution through 5 steps.
- With 64 processors, heat flow calculation requires 80% of compute time.
- Continuing run and will eventually increase $dt$.
- Setup and debugging process has used 30,000 hours on SP3.