

M3D-C1 ZOOM Meeting

03/28/2022

Upcoming Meetings

CS Issues

1. Mesh adaptation update
2. NERSC Time
3. Changes to github master since last meeting
4. Regression tests
5. Problem on cori-haswell
6. Change in documentation

Physics Studies

1. NF Paper with Chinese
2. Sawtooth Studies

Note: [meeting minutes posted on m3dc1.pppl.gov](https://m3dc1.pppl.gov)

In attendance

Steve Jardin

Adelle Wright

Jin Chen

Nate Ferraro

Cesar Clauser

P Sinha

Chang Liu

Anders Kleiner

Dingyun Liu

Mark Shephard

Seegyong Seol

Morteza

Upcoming Meetings

- Sherwood April 4-6 Santa Rosa, CA (in person)
 - CTTS Sunday April 3 –
 - Nate, Brendan, Adelle, me (in person)
 - Strauss (remote)
- ITPA: MHD, Disruptions, Control April 4-8 (remote)
- Runaway Electron Modeling, May 2-6 Garching (in person)
 - Abstract deadline April 10
- IAEA Technical Meeting on Plasma Disruptions and their Mitigation 19-22 July
 - In person at ITER HQ in France
 - Abstract submission by May 31

Mesh adaptation update

March 7 email:

I wanted to give you a quick update on the status of the 3D mesh adaptation. I am now able to run an adapt after a solve step and reconstruct the 3D mesh along with all the required fields for the next solve step (attached is a picture showing the adapted mesh and psi field value on each of the planes for the pellet example in the regression tests).

The solution on the next time step after adapting proceeds up to the point of computing "kprad_ionize". More specifically it fails here (https://github.com/PrincetonUniversity/M3DC1/blob/1795042ea7839513a69fd775b03c74d1ad8ec04d/unstructured/kprad_m3dc1.f90#L602) where it tries to do a matrix solve with the following PETSC error:

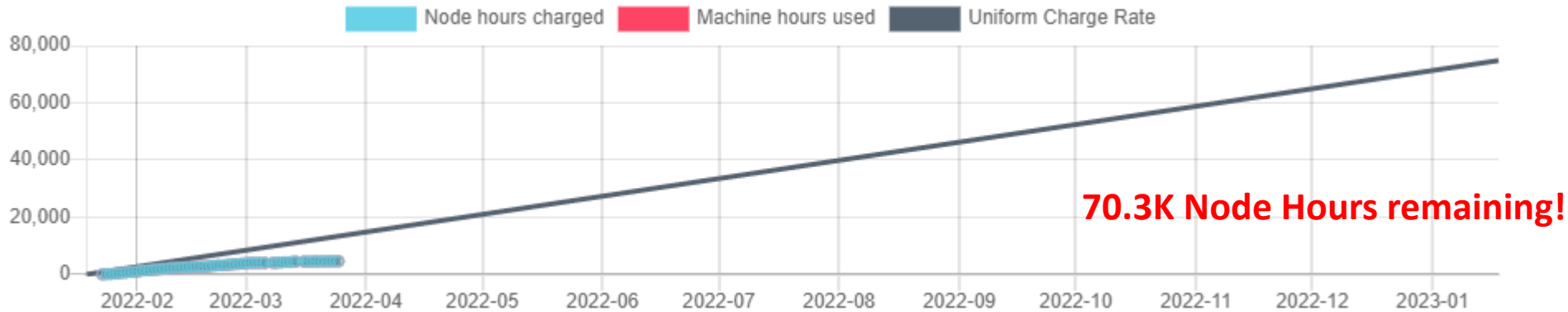
```
PCSetUp_BJacobi() line 93 in ../petsc-3.13.5_real/src/ksp/pc/impls/bjacobi/bjacobi.c Too many blocks given
```

I was wondering if anyone had any suggestions on what might be causing an error like that.

Thanks,
Morteza

NERSC Time

mp288



- New award period began Jan 19
- We are NESAP Tier 2 for Pearlmutter. . Phase-I w GPUs We have been given a repo m3984 with a small allocation. Presently we are not being charged.
- N9ES-N2 M3D-C1: J. Chen , C. Liu, S. Seol are early users

Changes to github master since 03/14/22

Nate Ferraro:

03/16/22: Add heating power diagnostic “pin”

03/18/22: Added kprad_n and kprad_n0 scalar diagnostics to track total impurities and neutral impurities

03/21/22: Implement pellet_mix for ipellet_abl = 0

03/22/22: Corrected bug in kprad_n diagnostic

Jin Chen:

03/17/22: upgrade cori_haswell, major OS

03/18/22: upgrade cori knl, major OS

Yao Zhou:

03/23/22: Integration by parts in b2beta for ST=1

Chang Liu

02/28/22: Improve GPU matrix assembling for RMP_nonlin

Local Systems

- PPPL centos7(03/26/22)
 - 7 jobs **PASSED**
- PPPL greene (03/26/22)
 - 5 jobs **PASSED**
- STELLAR (03/26/22)
 - 7 regression tests **PASSED** on stellar
- TRAVERSE(03/28/22)
 - RMP **PASSED** on traverse_gpu
 - RMP_nonlin **PASSED** on traverse_gpu

Other Systems

- Cori-KNL (03/25/2022)
 - 6 regression tests **PASSED**
 - NCSX **FAILED** with segmentation fault
- Cori-Haswell (03/18/2022)
 - 7 regression tests **PASSED**
- Perlmutter (03/26/2022)
 - 6 regression tests **PASSED**
 - NCSX **FAILED** (diverged iteration)
 - PC failed due to SUBPC_ERROR

cori_haswell

Trying to run a production job on cori_haswell

- Dies at different timesteps with the same initial error:
Linear solve did not converge due to DIVERGED_PC_FAILED iterations 0
- I submitted this 7 times, and it died on steps 17,23,23,2,4,4,0
- Runs fine on stellar

</global/cfs/cdirs/mp288/jardin/m3dnl/NSTX/121012>

Move “Users Guide” from Word to LaTeX?

Word Document presently has 23 sections:

1. Downloading and Compiling
2. Mesh Management
3. Importing Equilibrium Files
4. Running Jobs
5. Viewing Results and Post-Processing
6. Linear Stability Evaluation
7. PETSc Options Files
8. Input Variables in C1input
9. Relation between itor=0 and itor=1
10. Dimensionless Scaling
11. Grad-Shafranov Solver
12. G-SS with toroidal flow
13. Accessing TRANSP Data
14.

Nate started a LaTeX document in .../doc

1. Boundary Conditions
2. Discretization
3. Input Parameters

Appendix A: IDL Postprocessor

- This is in GITHUP and can be updated by the entire team
- Can we start from this version and incrementally add to it?
- Volunteers to work on certain sections?

NOTE: presently gives error “undefied color” red, blue, ... but compiles

NF Paper with Chinese accepted

Linear Simulation of Magnetohydrodynamic Plasma

Response to Three-Dimensional Magnetic

Perturbations in High- β_p Plasmas

R. Chen¹, B.C. Lyons², D.B. Weisberg², L.L. Lao², S. Ding^{1,3}, Y. Sun¹, A.M. Garofalo², X. Gong¹ and G.S. Xu¹

¹Institute of Plasma Physics, Chinese Academy of Sciences, Hefei 230031, People's Republic of China

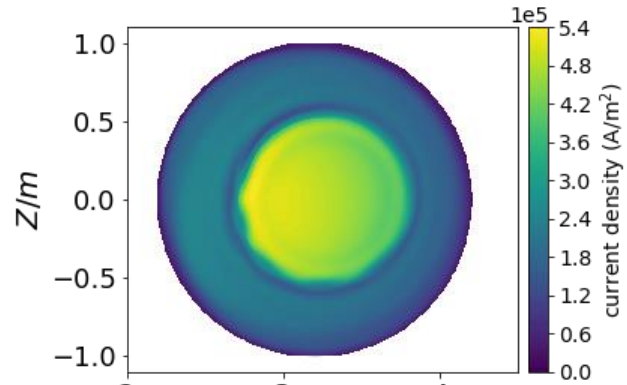
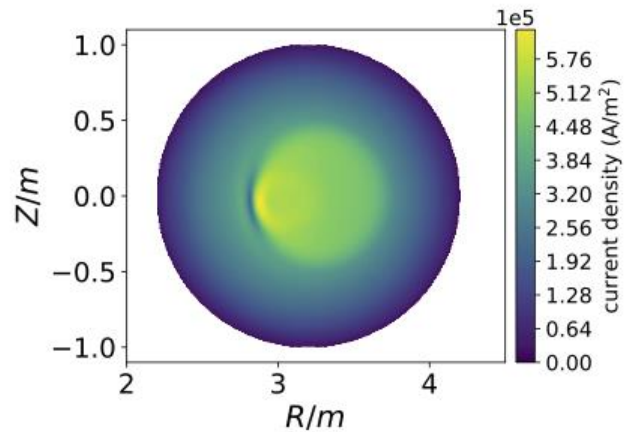
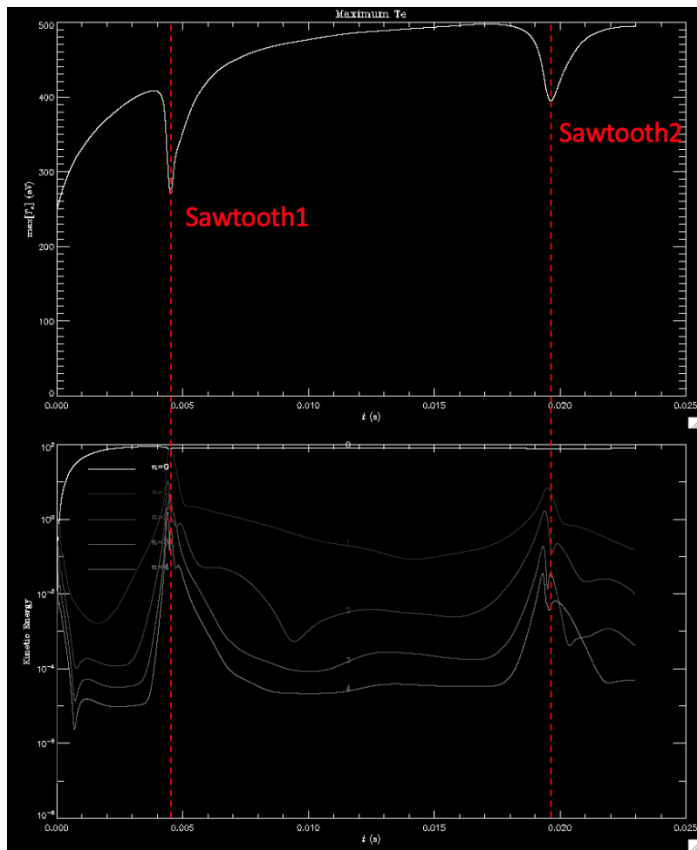
²General Atomics, PO Box 85608, San Diego, CA 92186-5608, United States of America

³Oak Ridge Associated Universities, Oak Ridge, TN 37831, United States of America

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- Linear study using M3D-C1
- Appeared in GA Highlights last week
- Where did they run?
- Will there be a follow-on? NL?

Sawtooth Run q04 from Dingyun



That's All I have

Anything Else ?

Next Meeting in 2 weeks (with LBL)