

M3D-C1 ZOOM Meeting

06/06/2022

Upcoming meetings and deadlines

CS Issues

1. SLU documentation update –Sherry Li
2. Other LBL Report
3. Mesh adaptation update -
4. NERSC Time
5. Changes to github master since last meeting
6. Regression tests
7. Segmentation error on Cori
8. Perlmutter_cpu tests

Physics Studies

1. PRL on temperature flattening accepted
2. Status of Chen Zhao paper
3. Fishbone simulations of DIII-D ... Chang Liu

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

In attendance

Steve Jardin
Adelle Wright
Hank Strauss
Cesar Clauser
Chang Liu
Anders Kleiner
Brendan Lyons
P. Sinha

Mark Shephard
Seegyong Seol
Morteza

Sam Williams
Sherry Li
Nan Ding
Yang Liu

Upcoming Meetings and Deadlines

- APS DPP abstract submission deadline is Friday July 1

New SuperLU_dist documentation

Sherry Li

Other LBL Updates

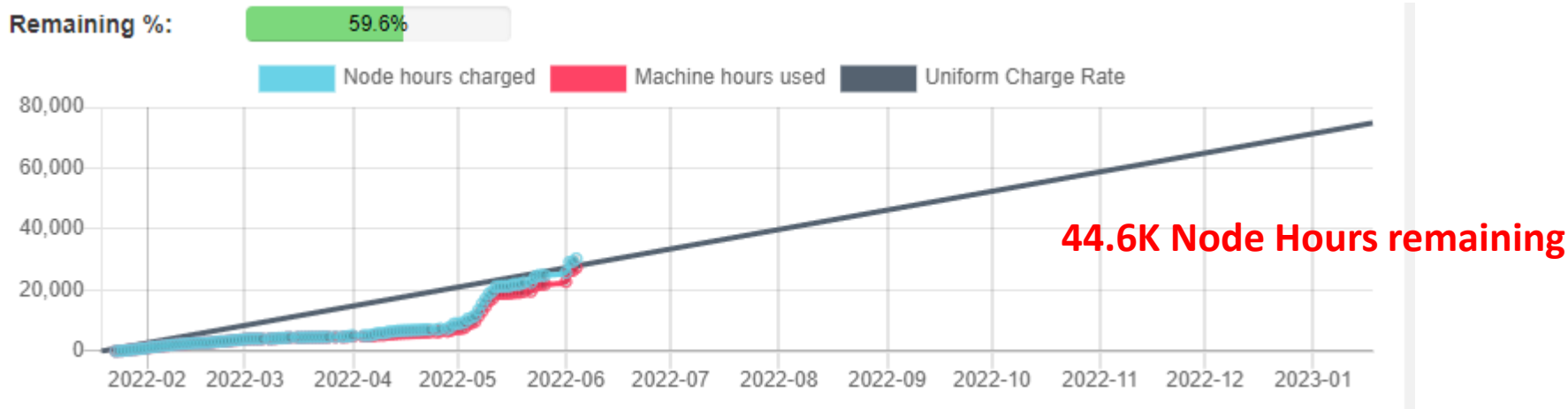
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Mesh adaptation update (and make update)

Any update?

NERSC Time

mp288



- We are NESAP Tier 2 for Pearlmuter. . 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
- Perlmuter_cpu is now available and there is no charge for the year!

Changes to github master since 5/08/22

Yao Zhou

05/09/22: Restart full torus from single period

Brendan Lyons

05/09/2022: Remove unused .mk files

05/13/2022: Prevent make clean from deleting other M3DC1_ARCH builds

05/23/2022: Initialize variables to prevent floating point errors

Jin Chen

05/11/2022: scorec configure files on cori_haswell & KNL & GPU, Perlmutte

05/12/2022: KNL ST version segfault fixed

05/19/2022: For Perlmutter cpu-only nodes: all regtests passed except NCSX

Nate Ferraro

05/16/22: Remove NaNs from KPRAD ionization/recombination. Test KPRAD advect output for NaNs, and if they exist, revert old solution

05/18/22: Overwrite initial \$OPTs env variable in makefile to avoid duplicate

Seegyong Seol

06/02/22: adding tex files for User's guide

Local Systems

- PPPL centos7(06/04/22)
 - 7 jobs **PASSED**
 - KPRAD_restart failed on first try, then passed
- PPPL greene (06/04/22)
 - 5 jobs **PASSED**
- STELLAR (06/04/22)
 - 7 regression tests **PASSED** on stellar
- TRAVERSE_gpu(06/05/22)
 - 5 regression tests **PASSED**
 - KPRAD_2D, KPRAD_restart **FAILED** due to 0.001 fractional diff in C1ke

- Cori-KNL (06/05/2022) **NERSC**
6 regression tests **PASSED**
NCSX **FAILED** with C1ke mismatch (fractional difference .0011)
- Cori-Haswell (06/04/2022)
7 regression tests **PASSED**
- Perlmutter (06/05/2022)
6 regression tests **PASSED**
NCSX **FAILED** with Segmentation violation
- Perlmutter_cpu (06/04/22)
6 regression tests **PASSED**
NCSX failed

Segmentation error on Cori-Haswell at end

Adelle Wright: (5/12/2022}

Currently, my stellarator runs on cori-haswell are completing but not exiting cleanly. Jin identified the issue as that mentioned below.

Jin Chen: (4/21/2022)

The segfault is caused by line
613 call MPI_Finalize(ier)

in file "newpar.f90". So you don't have to worry about it for now. I'll look into the cause of it.

4-plane Runs on Perlmutter_cpu

mesh part f/p cpu/N planes pre nodes sec/ts n-sec/ts

Run04 K 32 3070 32 4 mumps 4 failed
Run04 K 64 1535 32 4 mumps 8 600 4800
Run01 K 128 768 32 4 mumps 16 330 5280
Run02 K 128 768 64 4 mumps 8 340 2720 **

mesh part f/p cpu/N planes pre nodes sec/ts

Run01 J 32 1356 16 4 SLU 8 410 3280
Run02 J 32 1356 32 4 SLU 4 440 1760
Run03 J 32 1356 16 4 mumps 8 390 3120
Run04 J 32 1356 32 4 mumps 4 420 1680
Run03 J 64 678 16 4 mumps 16 210 3360
Run04 J 64 678 32 4 mumps 8 230 1840
Run05 J 64 678 64 4 mumps 4 230 920 **

mesh part f/p cpu/N planes pre nodes sec/ts

Run02 H 32 1189 16 4 SLU 8 360 2880
Run03 H 32 1189 32 4 SLU 4 390 1560
Run03 H 64 594 32 4 mumps 8 200 1600
Run04 H 64 594 64 4 mumps 4 203 812 **

3 Meshes of different sizes

Mesh # faces

H 38065

J 43418

K 98251

Best configuration is:

Enough partitions so 600-800 f/p
64 cpus per node




Larger Runs on Perlmutter_cpu

Similar runs with 8 planes and 36 planes failed due to:
“PC failed due to SUBPC ERROR”

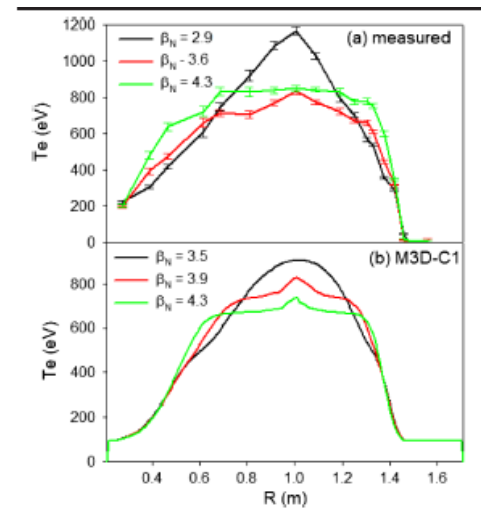
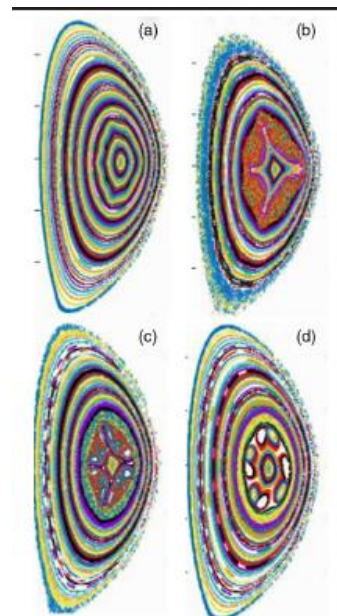
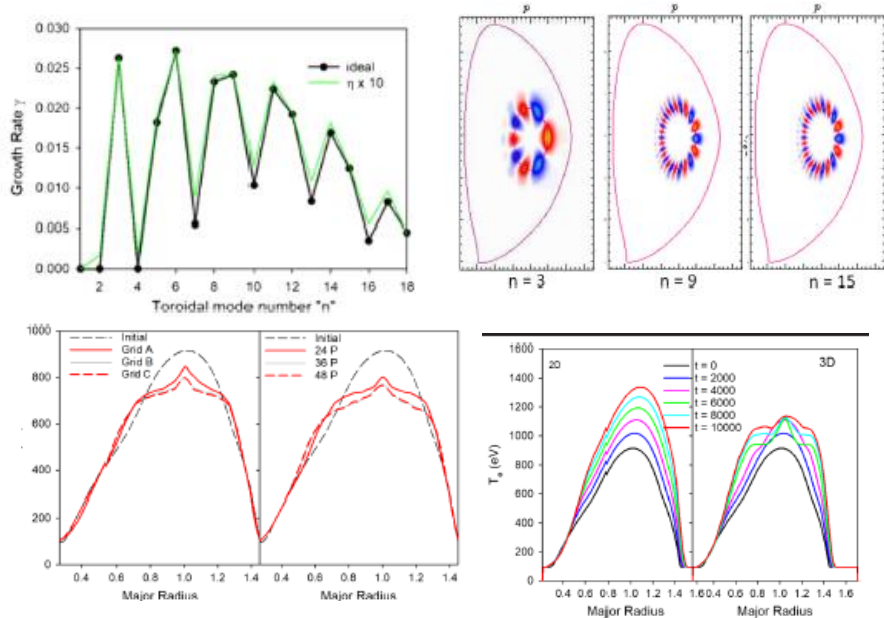
These runs did not fail immediately but after a few time steps, at which point NaN were generated. You can view one at:

`/global/cfs/cdirs/mp288/Jardin/m3dnl/Perl_cpu/128-K/Run05`

Ideal MHD Limited Electron Temperature in Spherical Tokamaks

S. C. Jardin , N. M. Ferraro, W. Guttenfelder , S. M. Kaye, and S. Munaretto 
 Princeton Plasma Physics Laboratory, P.O. Box 451, Princeton, New Jersey 08543 USA

Now preparing longer paper
 with more data



Papers in Preparation

- Chen Zhao, C. Liu, et al, “Simulation of DIII-D disruption with pellet injection and runaway electron beam”
 - **Brendan:** Can you include the equations and text for pellet ablation that were used in the paper status?
 - **Chang:** Can you look at the description of the runaway sources in the paper and correct? Status?
 - **Chen:** Is paper ready for another read?

Fishbone Simulations of DIII-D

Chang Liu

That's All I have

Anything Else ?

Next Meeting June 20

With LBL July 11?