

Preliminary results for nonlinear benchmark between HYMAGYC, MEGA and ORB5

peaked off-axis AUG-NLED equilibrium,
Energetic Particle density profile

G. Vlad, X. Wang, F. Vannini et al.

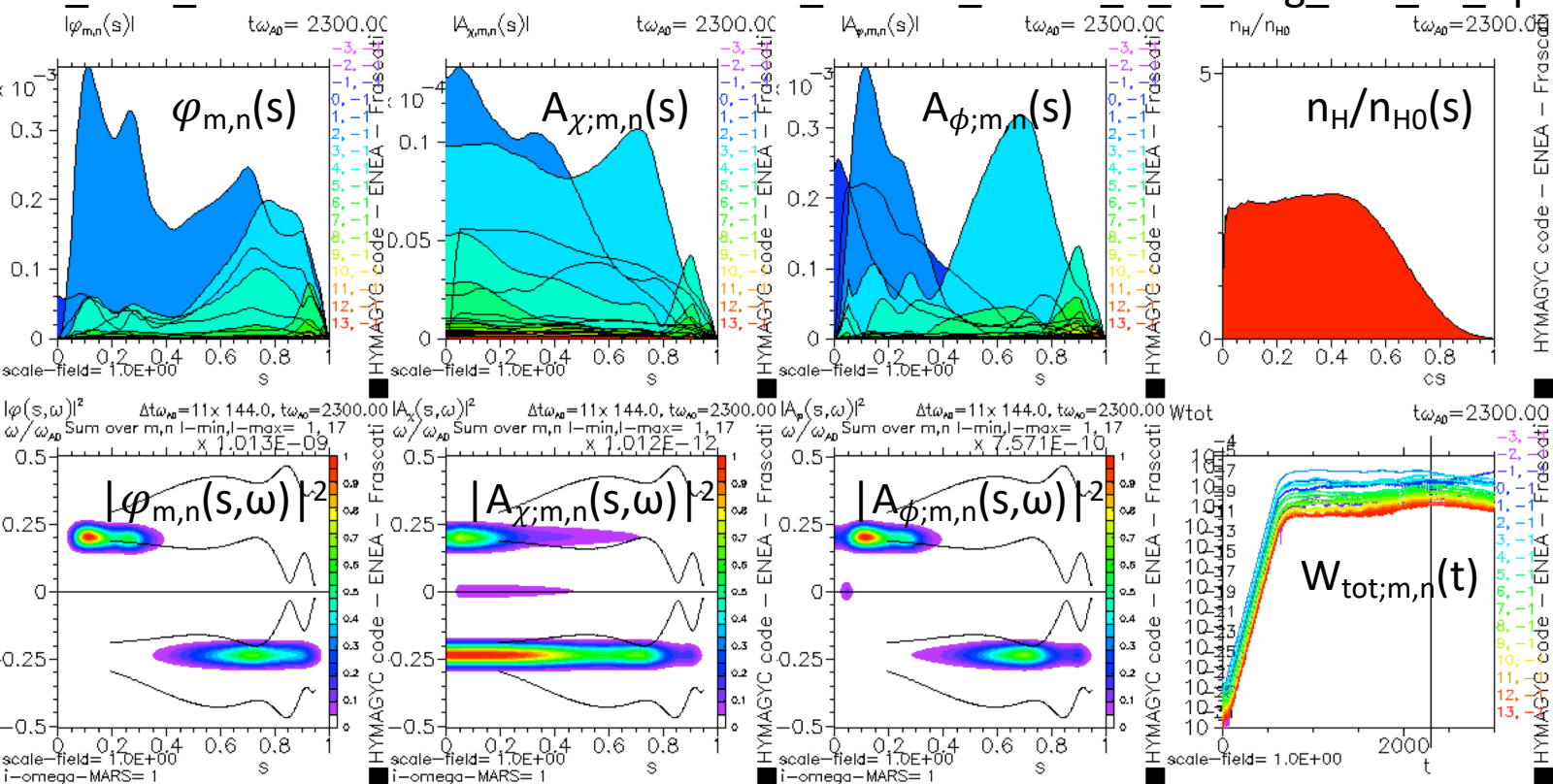
TSVV #10 General meeting 2021.10.27

$n=-1$, HYMAGYC, animated gif, nominal n_{H0}/n_{i0} , FLR included:

.../casi_AUG_nonmonotonic-BM-2020-scaled_n_H/

caso_AUG-nonmonotonic-BM-2020-T_H0.093_scaled_n_H_long_FLR_all_Aperp/

an_caso_AUG-nonmonotonic-BM-2020-T_H0.093_scaled_n_H_long_FLR_all_Aperp_300x300

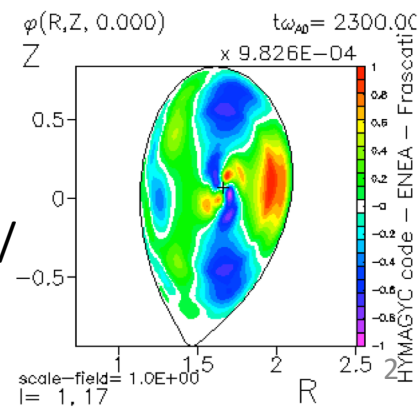


$n=-1$, HYMAGYC, animated gif, nominal n_{H0}/n_{i0} , FLR included:

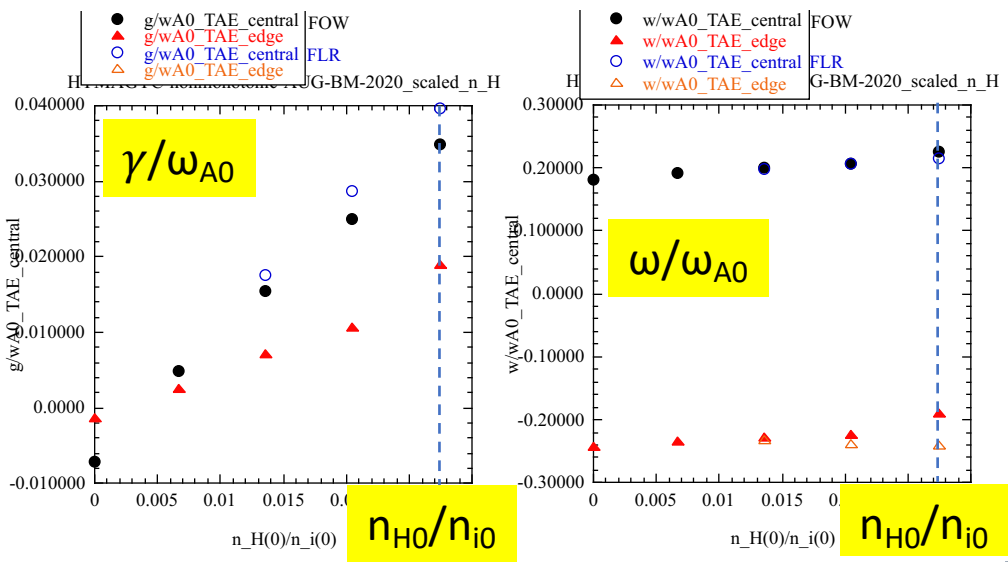
.../casi_AUG_nonmonotonic-BM-2020-scaled_n_H/

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movie_fitto_increm1/an_ph.gif

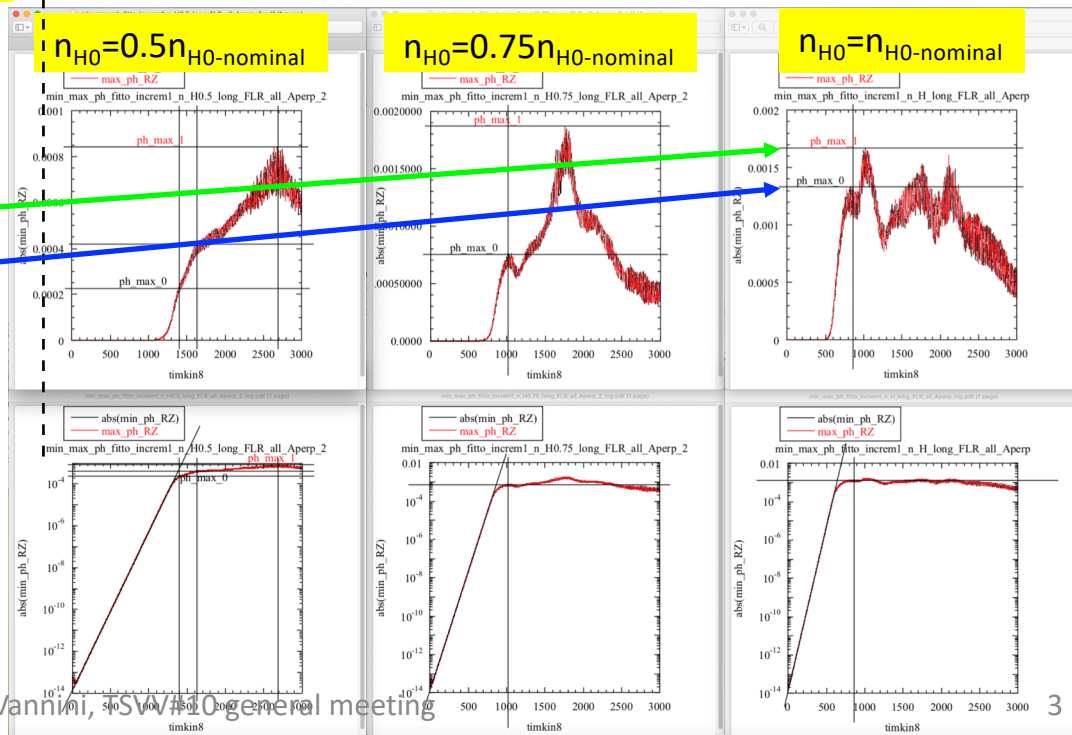
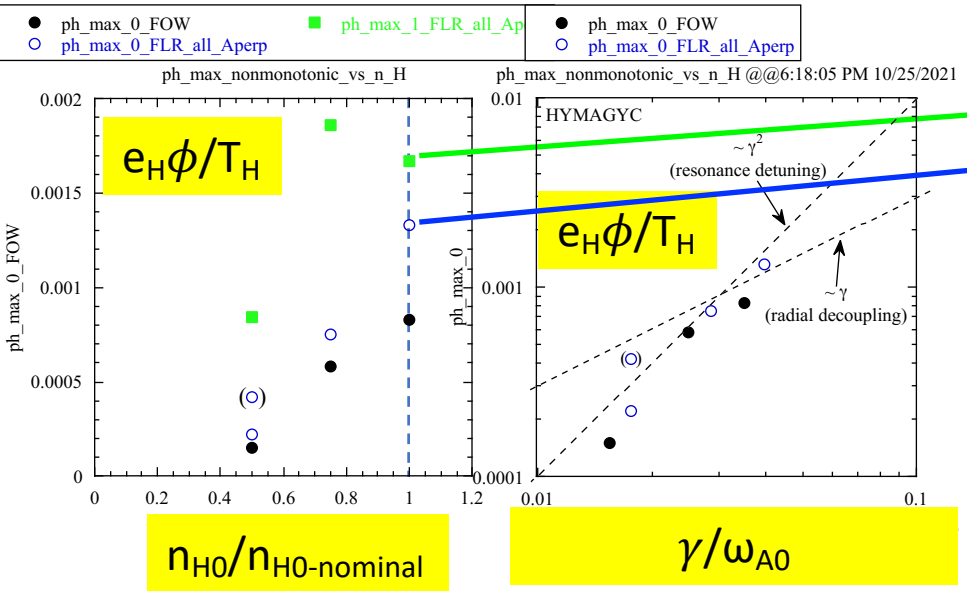


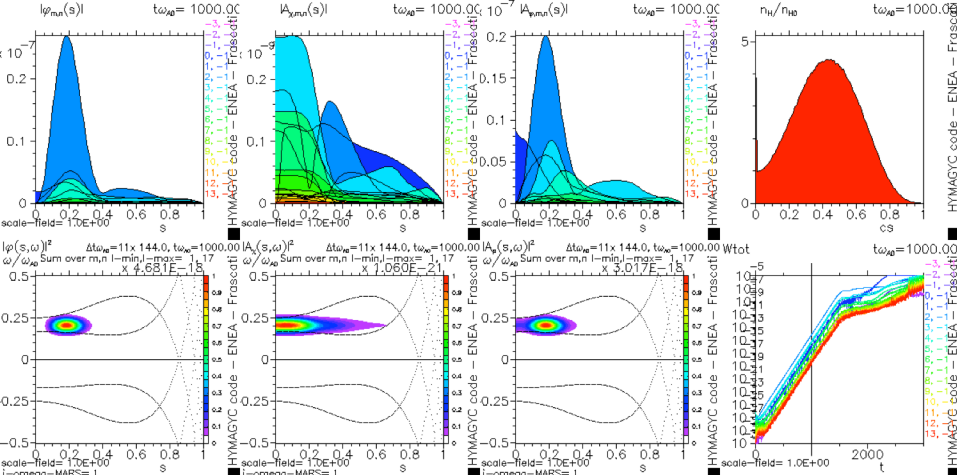
n=-1, HYMAGYC, linear growth-rate and frequency (FOW vs. FLR)



n=-1, HYMAGYC, abs(ph-min/max) FLR

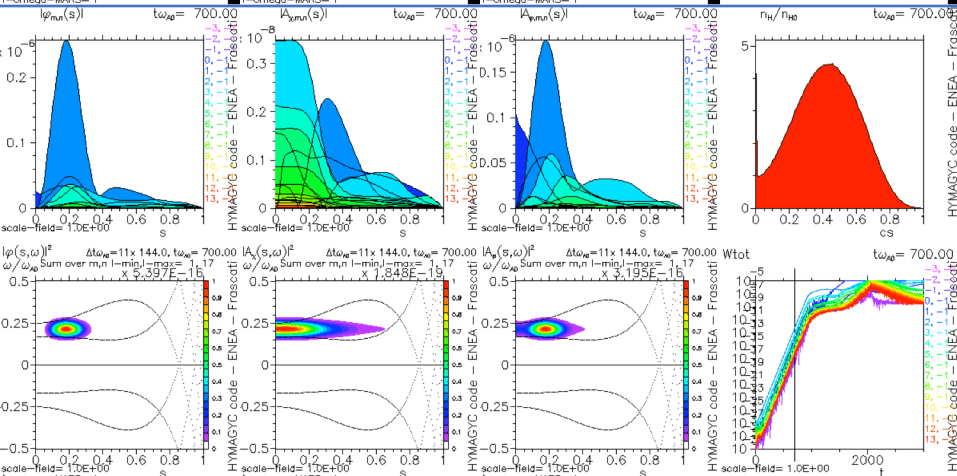
n=-1, HYMAGYC, nonlinear saturation



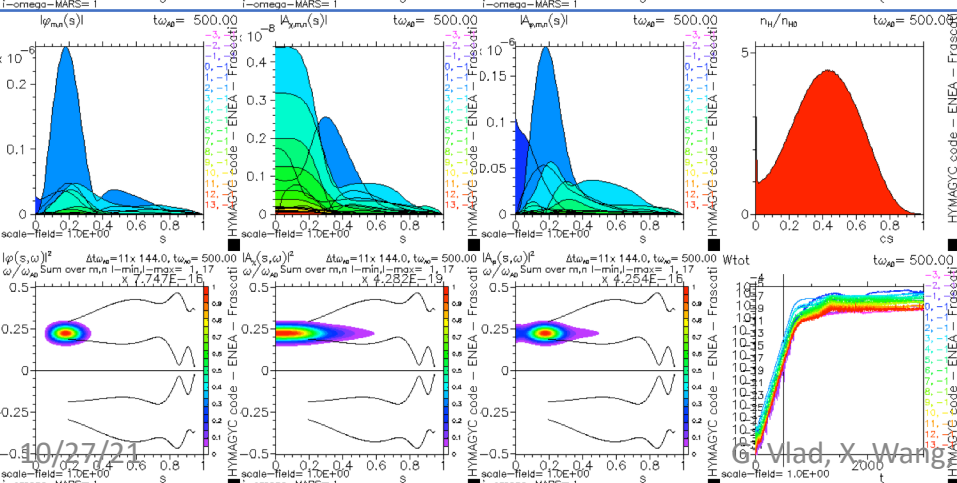


$n=-1$, HYMAGYC FOW, $n_{H0}/n_{i0}=0.5 \times n_{H0}/n_{i0} |_{\text{nominal}}$

$\varphi_{m,n}(s)$	$A_{\chi;m,n}(s)$	$A_{\phi;m,n}(s)$	$n_H/n_{H0}(s)$
$ \varphi_{m,n}(s,\omega) ^2$	$ A_{\chi;m,n}(s,\omega) ^2$	$ A_{\phi;m,n}(s,\omega) ^2$	$W_{\text{tot};m,n}(t)$



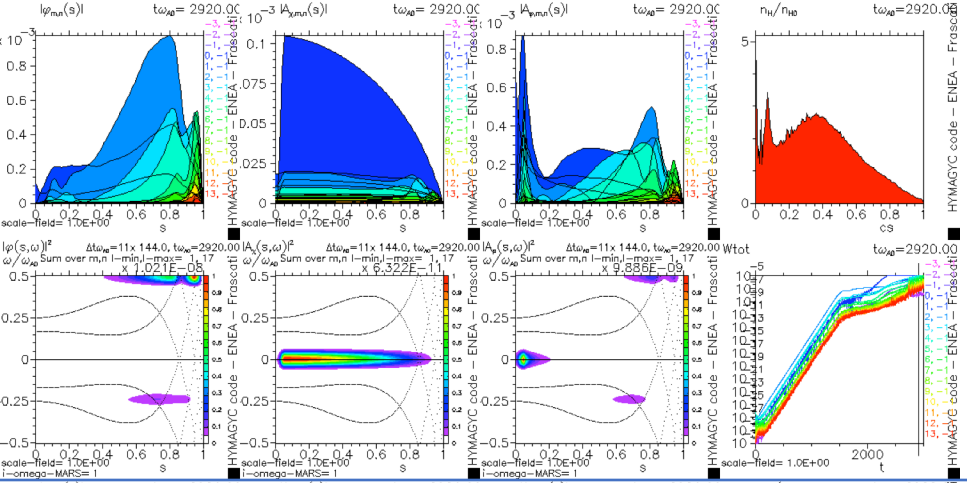
$n=-1$, HYMAGYC FOW, $n_{H0}/n_{i0}=0.75 \times n_{H0}/n_{i0} |_{\text{nominal}}$



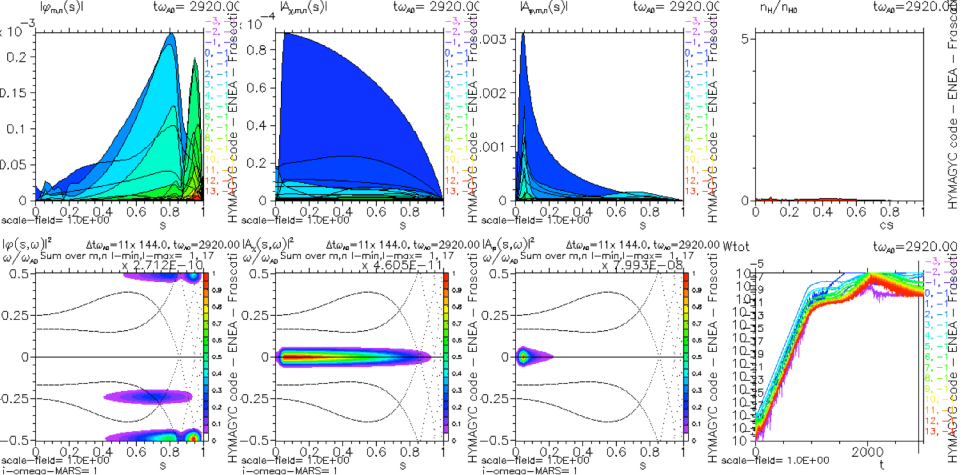
$n=-1$, HYMAGYC FOW, $n_{H0}/n_{i0}=1.0 \times n_{H0}/n_{i0} |_{\text{nominal}}$

$n=-1$, HYMAGYC FOW, $n_{H0}/n_{i0}=0.5 \times n_{H0}/n_{i0} |_{\text{nominal}}$

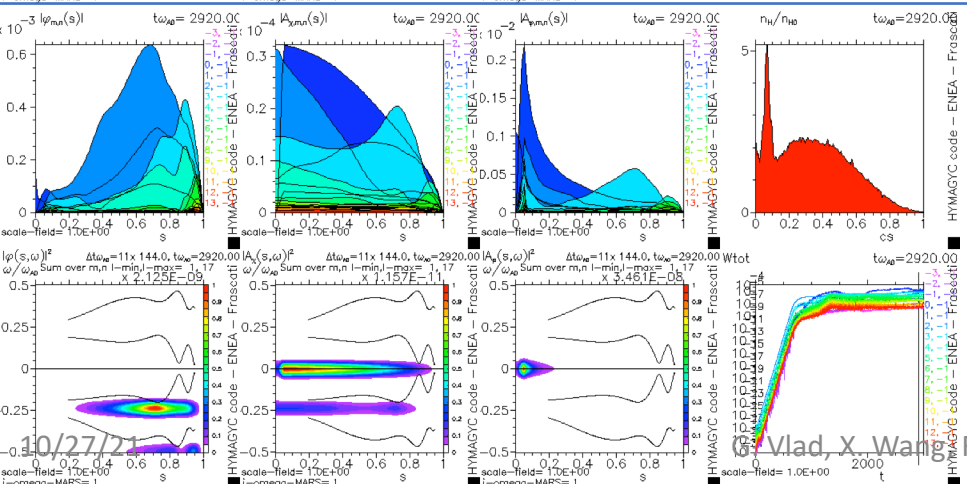
$\varphi_{m,n}(s)$	$A_{\chi;m,n}(s)$	$A_{\phi;m,n}(s)$	$n_H/n_{H0}(s)$
$ \varphi_{m,n}(s,\omega) ^2$	$ A_{\chi;m,n}(s,\omega) ^2$	$ A_{\phi;m,n}(s,\omega) ^2$	$W_{\text{tot};m,n}(t)$

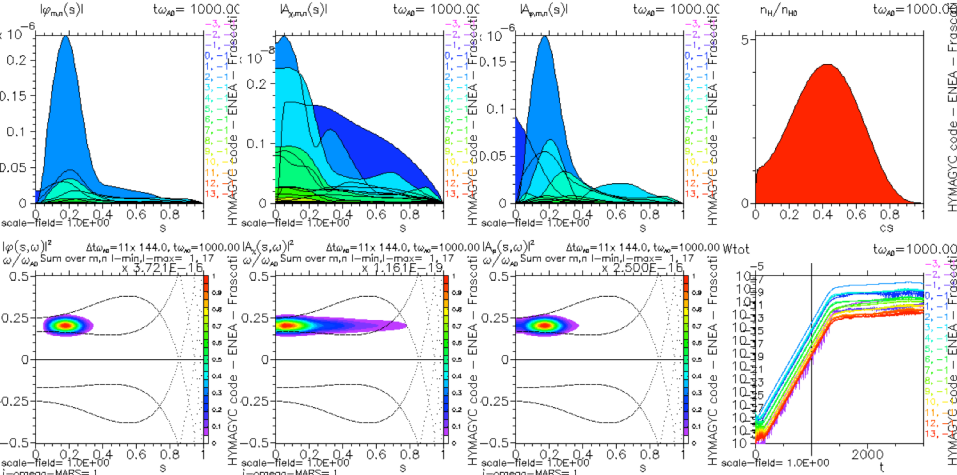


$n=-1$, HYMAGYC FOW, $n_{H0}/n_{i0}=0.75 \times n_{H0}/n_{i0} |_{\text{nominal}}$



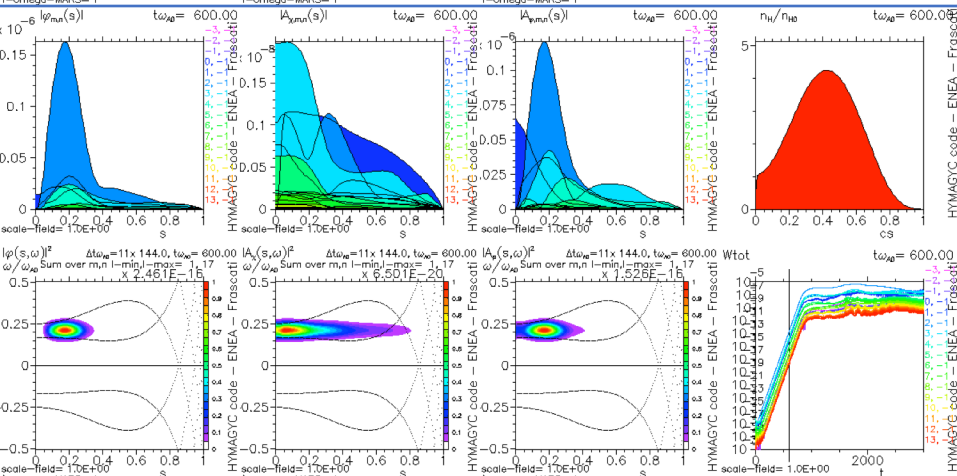
$n=-1$, HYMAGYC FOW, $n_{H0}/n_{i0}=1.0 \times n_{H0}/n_{i0} |_{\text{nominal}}$



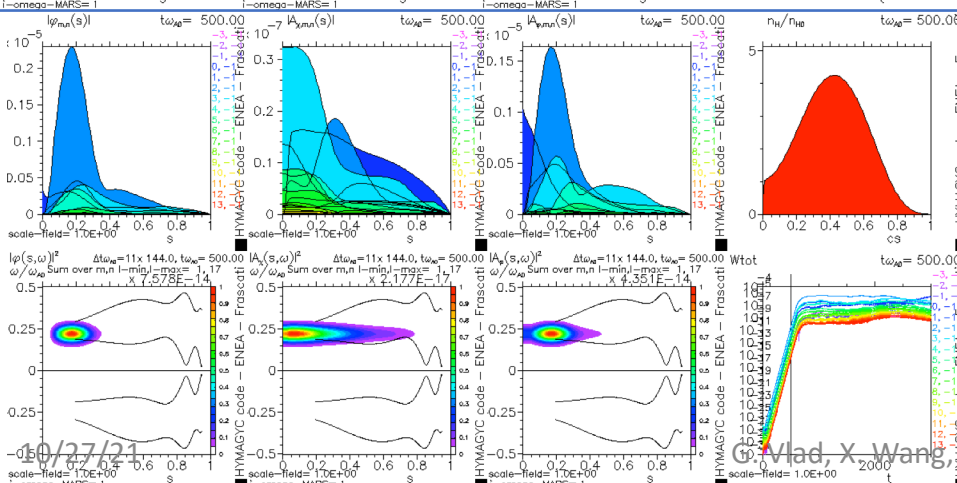


$n=-1$, HYMAGYC FLR, $n_{H0}/n_{i0}=0.5 \times n_{H0}/n_{i0}$ | nominal

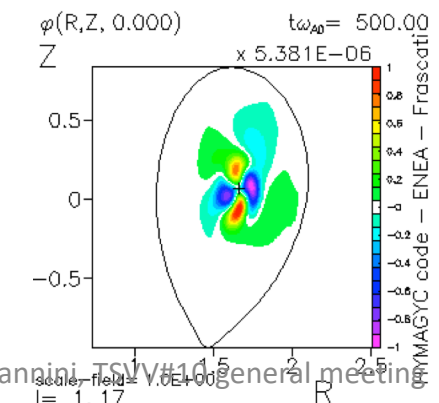
$\varphi_{m,n}(s)$	$A_{\chi;m,n}(s)$	$A_{\phi;m,n}(s)$	$n_H/n_{H0}(s)$
$ \varphi_{m,n}(s,\omega) ^2$	$ A_{\chi;m,n}(s,\omega) ^2$	$ A_{\phi;m,n}(s,\omega) ^2$	$W_{tot;m,n}(t)$



$n=-1$, HYMAGYC FLR, $n_{H0}/n_{i0}=0.75 \times n_{H0}/n_{i0}$ | nominal

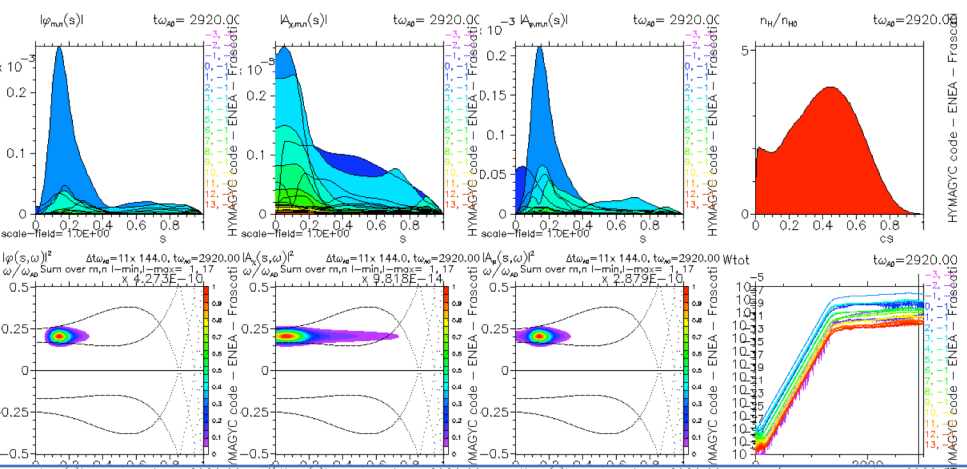


$n=-1$, HYMAGYC FLR, $n_{H0}/n_{i0}=1.0 \times n_{H0}/n_{i0}$ | nominal

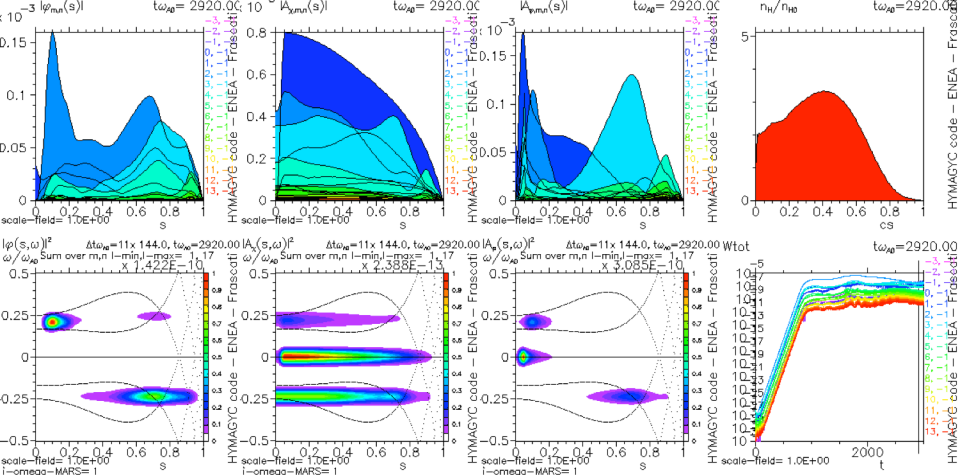


$n=-1$, HYMAGYC FLR, $n_{H0}/n_{i0}=0.5 \times n_{H0}/n_{i0}$ | nominal

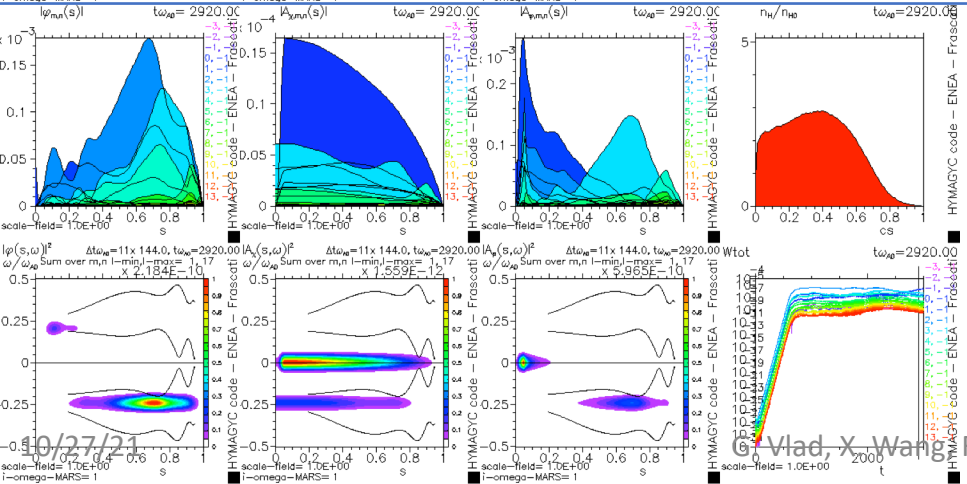
$\varphi_{m,n}(s)$	$A_{\chi;m,n}(s)$	$A_{\phi;m,n}(s)$	$n_H/n_{H0}(s)$
$ \varphi_{m,n}(s,\omega) ^2$	$ A_{\chi;m,n}(s,\omega) ^2$	$ A_{\phi;m,n}(s,\omega) ^2$	$W_{tot;m,n}(t)$



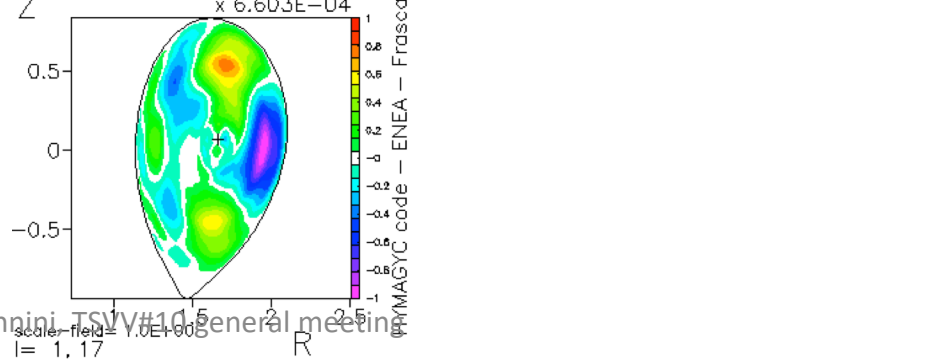
$n=-1$, HYMAGYC FLR, $n_{H0}/n_{i0}=0.75 \times n_{H0}/n_{i0}$ | nominal

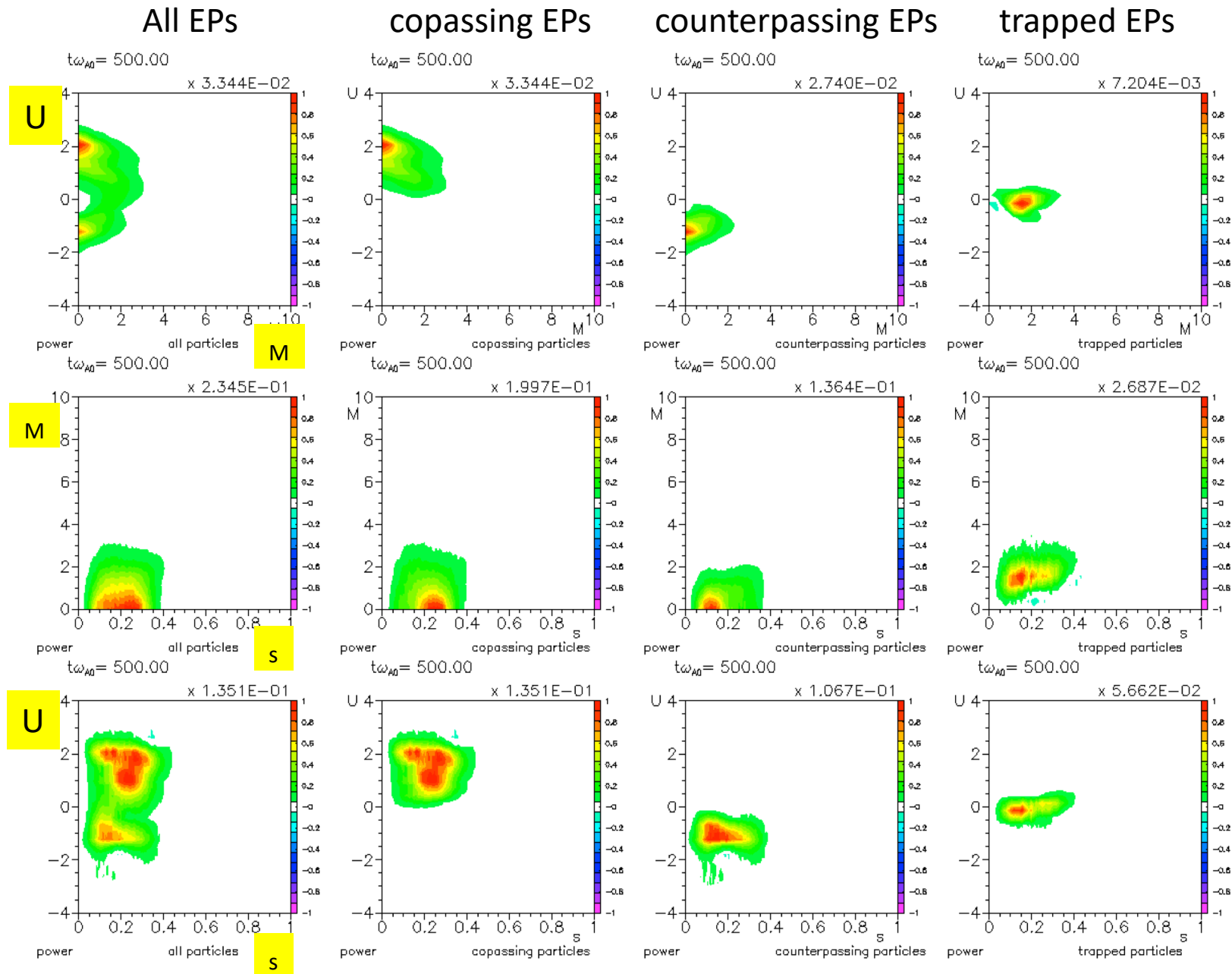


$n=-1$, HYMAGYC FLR, $n_{H0}/n_{i0}=1.0 \times n_{H0}/n_{i0}$ | nominal



$\varphi(R,Z, 0.000)$ $t\omega_{p0} = 2920.00$

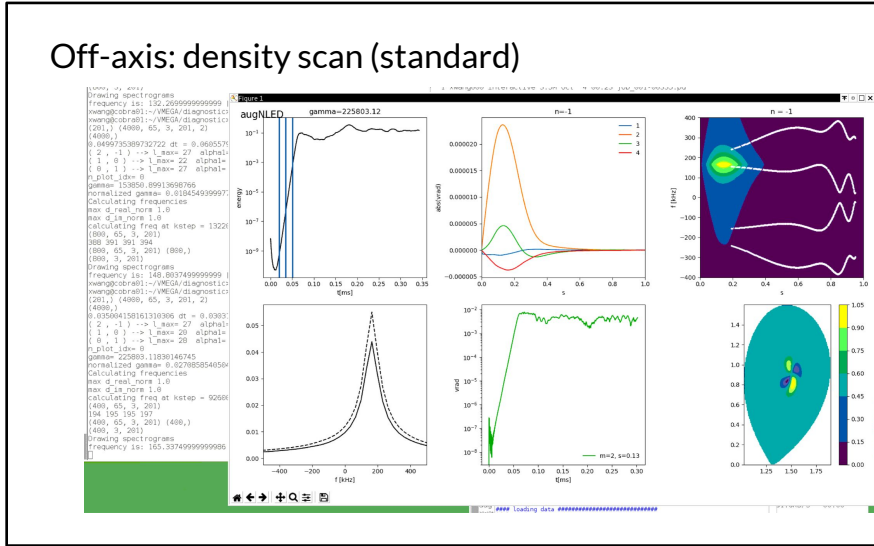




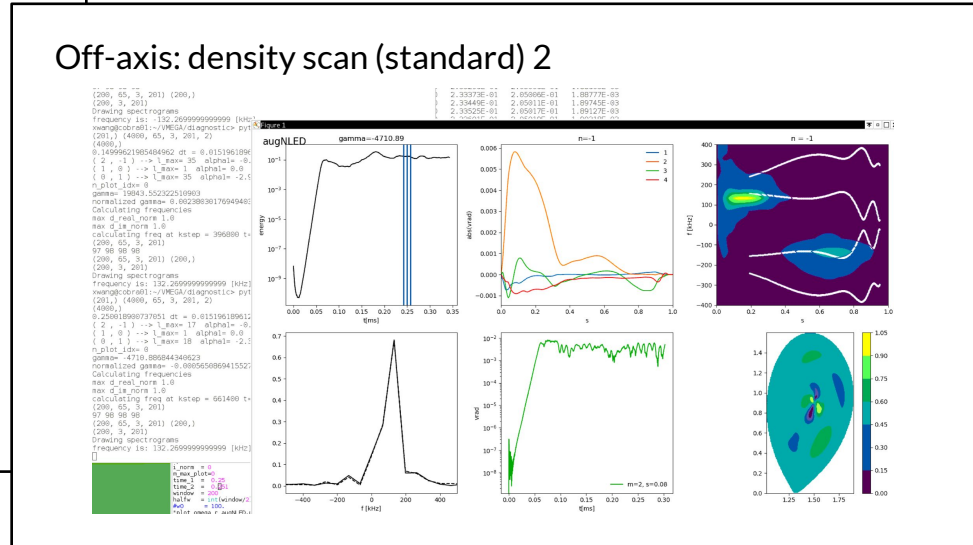
Similar qualitative behavior observed in simulation with MEGA and ORB5 (work-in-progress, quantitative comparison still to be done)

MEGA:

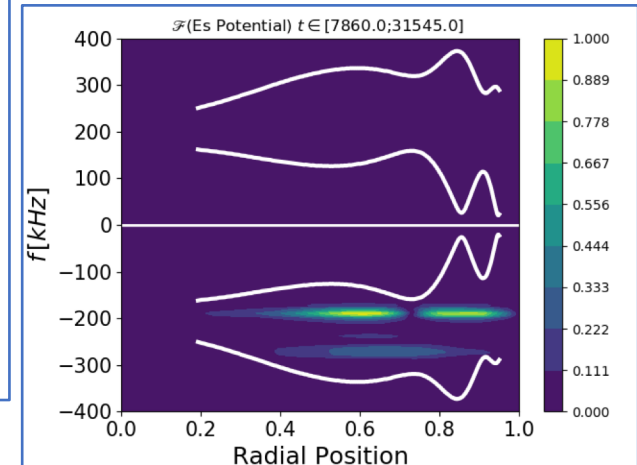
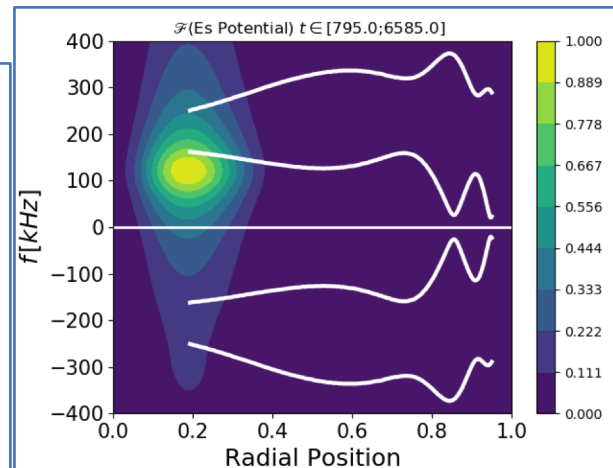
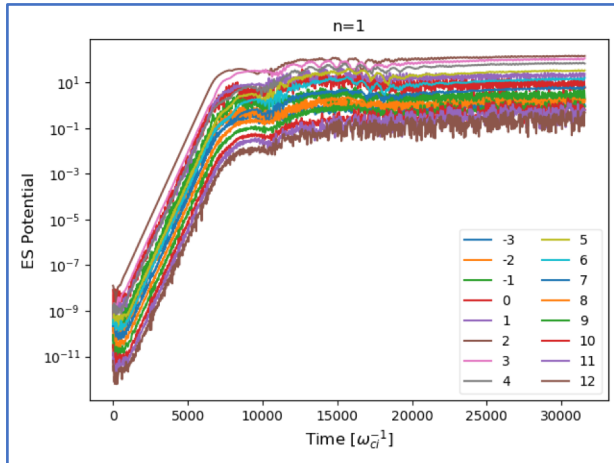
Off-axis: density scan (standard)



Off-axis: density scan (standard) 2



ORB5:



Progress in using HYMAGYC with IMAS-IDSs and Kepler with batch execution

hamiltonian_mpi.f
 hamiltonian_mpi.f_hamiltonian
 hamiltonian_mpi.f_multi_n

istore_new, i_restart

/hymagycimas/hymagycimas/hymagycimas#34
 01.data istep_mhd_old.data
 ta JavaJniCall.java
 last_step_fields_01

Shell - Konsole <5>

Session Edit View Bookmarks Settings Help

```
g2gvlad/my_keplers/my_kepler_2.5p5-3.1
[run] Building Library.
[run] Scanning Local Repositories
[run] INFO (org.kepler.kar.KAR)
[run] Starting HSQL Server for c
[run] INFO (org.kepler.util.sql)
g2gvlad/my_keplers/my_kepler_2.5p5-3.1
[run] Initializing Actor Tree.
[run] Initializing Library Search
[run] Initializing Ontology Sele
[run] Initializing Library Pane
[run] *** Attempting to get Reso
[run] *** svgRenderingMethod = s
[run] Checking for patches...
[run] KEPLER DIR: /pfs/work/g2gvlad/my_keplers/my_kepler_2.5p
[run] 2021-10-26 13:07:34:446 [hymagycimas3290] RELOAD: 2 [ms
agycimas3290_def.so
[run] Warning: IDS core_profiles is found to be EMPTY (homoge
[run] cp -r /pfs/work/g2gvlad/my_keplers/my_kepler_2.5p5-3.1.
[run] Submitted batch job 140608
[run] /pfs/scratch/g2gvlad/KEPLER_SANDBOX//hymagycimas/hymagy
[run] 272997 ms. Memory: 1568768K Free: 1127793K (72%)
```

file:/afs/eufus.eu/user/g2gvlad/hymagycgw/trunk/workflows/hymagycimas.xml

File Edit View Workflow Tools Window Help

Components Data Outline

Search Components

Advanced S... Sources Cancel

All Ontologies and Folders

Components Disciplines Projects Demos Actors DataTurbine Directories Imas Job Opendap Outreach R

0 results found.

execution finished: 272997 ms. Memory: 1568768K

g2gvlad/my_keplers/my_kepler_2.5p5-3.1

g2gvlad/my_keplers/my_kepler_2.5p5-3.1

g2gvlad/my_keplers/my_kepler_2.5p5-3.1

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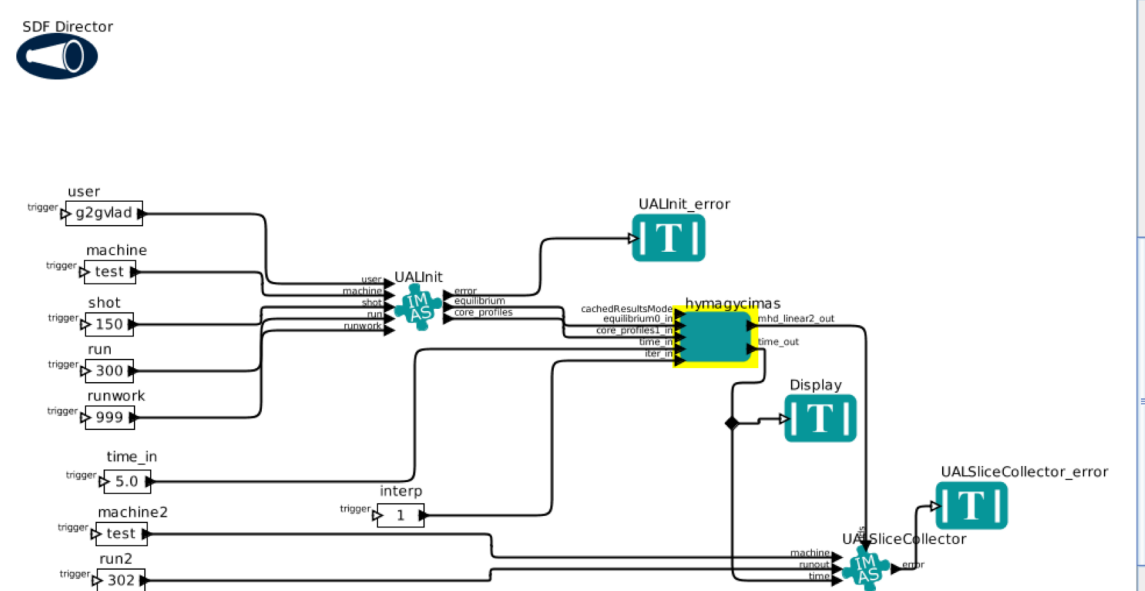
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g2gvlad/my_keplers/my_kepler_2.5p5-3.1

g2gvlad/my_keplers/my_kepler_2.5p5-3.1

g2gvlad/my_keplers/my_kepler_2.5p5-3.1



Edit parameters for hymagycimas

```
?
execution mode: batch
----- SANDBOX -----:
Run in sandbox: [x]
Sandbox lifetime: Actor execution
Clean up sandbox: [ ]
Sandbox dir name:
Delete sandbox: [x]
----- MPI -----:
MPI enabled: [x]
number of MPI process: 2
----- OpenMP -----:
OpenMP enabled: [x]
Number of OpenMP threads: 2
----- BATCH -----:
batch file: #!/bin/sh
#SBATCH --job-name=KEP_ACTOR
#SBATCH --nodes=2
#SBATCH --ntasks-per-node=1
#SBATCH --time=30:00
#SBATCH --mem=180000
#SBATCH --partition=gwdbg
#SBATCH --wait
```