Some lessons learned from the 2020-03 virtual working session

- Zoom worked well
  - Particularly helpful were the breakout rooms
  - But this does require the meeting host be available to move people around
- Interaction improved once we started having regular plenary summaries (10:00 and 15:00)
- Slack was also helpful in sharing tips, results, questions
- Some productivity was lost because people were not away at the event
  - Home lab interactions
  - Home (domestic) interactions
- Not quite as effective as a face-to-face event, bit worth continuing
  - Limited spontaneous interactions (such as would occur at coffee breaks, lunches, dinners)
  - Still quite demanding in terms of concentration!

"Risø" virtual working session
Progress on a variety of fronts

- ETS5
- ETS6
  - Main workflow
  - ETS-5 / ETS-6 comparisons
  - Validation of ITER scenarios
  - Core-Edge
- Turbulence workflow
 - Including data input
- CHERAB
- Runaway electrons

ETS-5 progress

- Jorge Ferreira
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#ETS5
    - Added support for Solver 4 to solver_test (MMS), (commit > ETS5/R2209)
    - hyper-diffusion issues fixed by applying a cutoff for rho_tor_norm > rho_cut (commit > ETS5/R2210)

- Dmitry Yadikin
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Dmitriy_Yadykin
    - Benchmark activities ETS 5/6

ETS-5 progress (JF)

- Add support for Solver 4 to solver_test (MMS), (commit > ETS5/R2209)
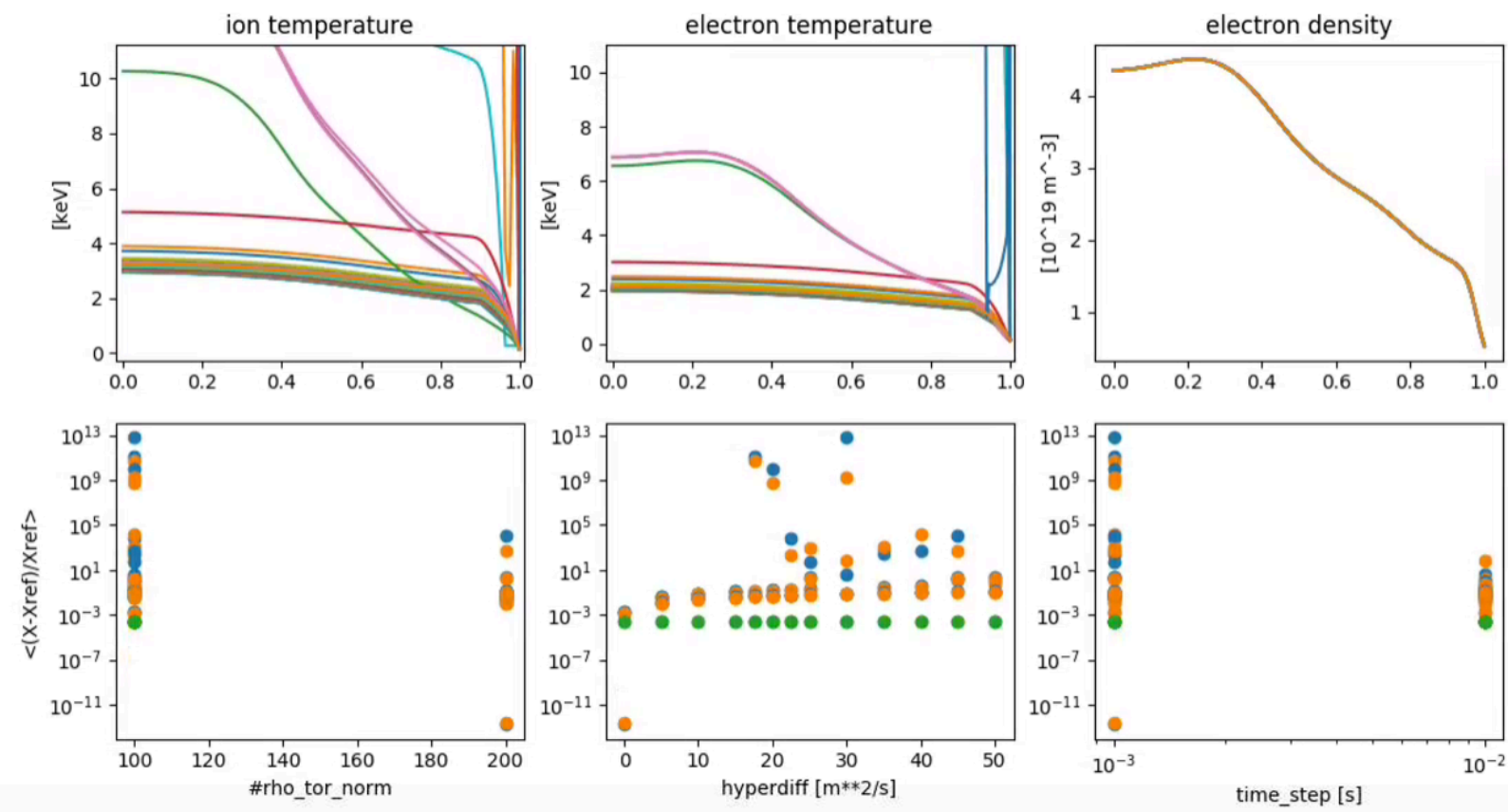 - Comparison within MMS

- Fixed limits rho->0 for current equation, (commit > ETS5/R2210)
  - Simple comparison of current diffusion during ~9 seconds for a JET pulse using solver 4 and 11. No visible (outstanding) differences. Numerical relevant only - no sources used apart from bootstrap current.
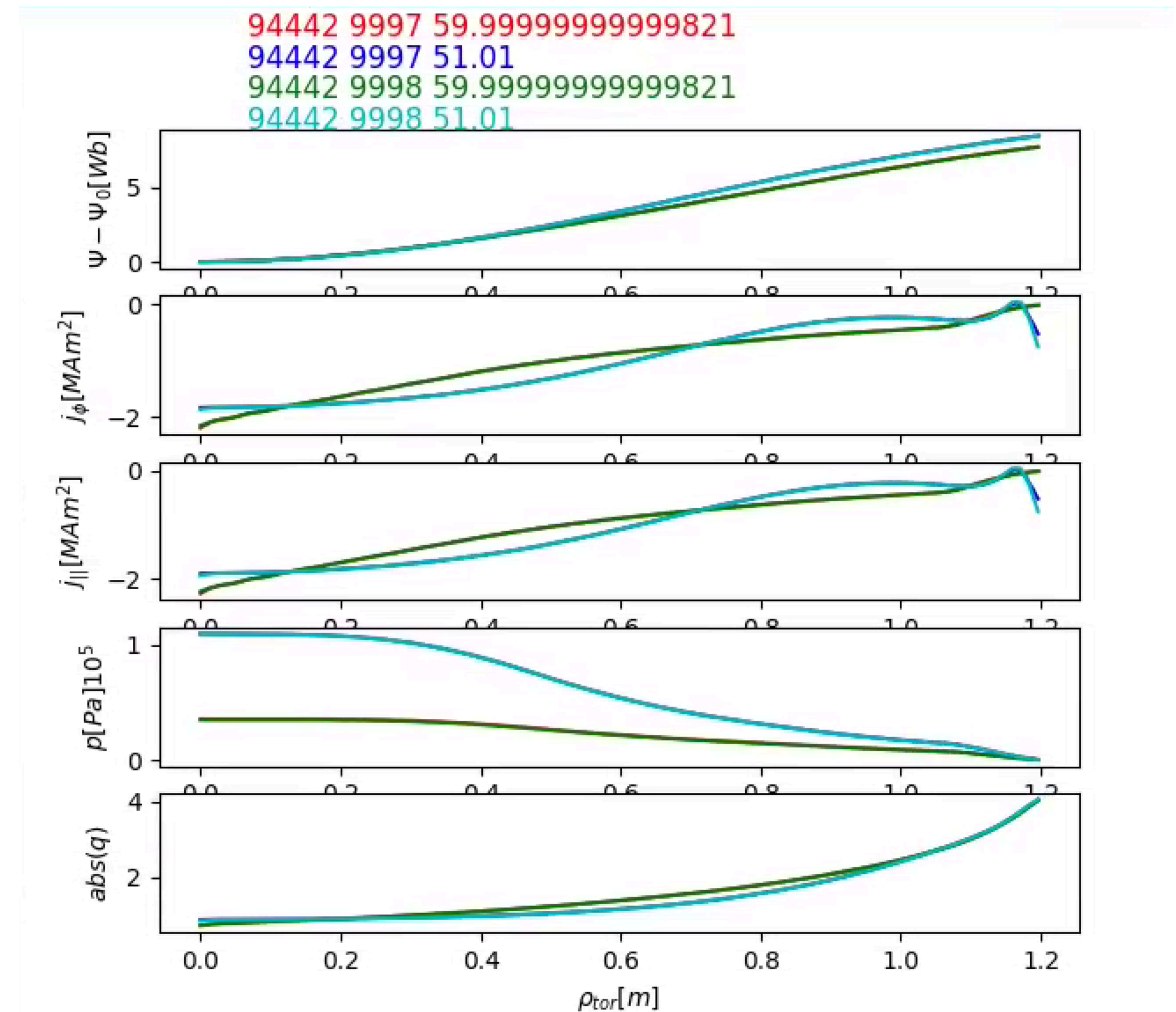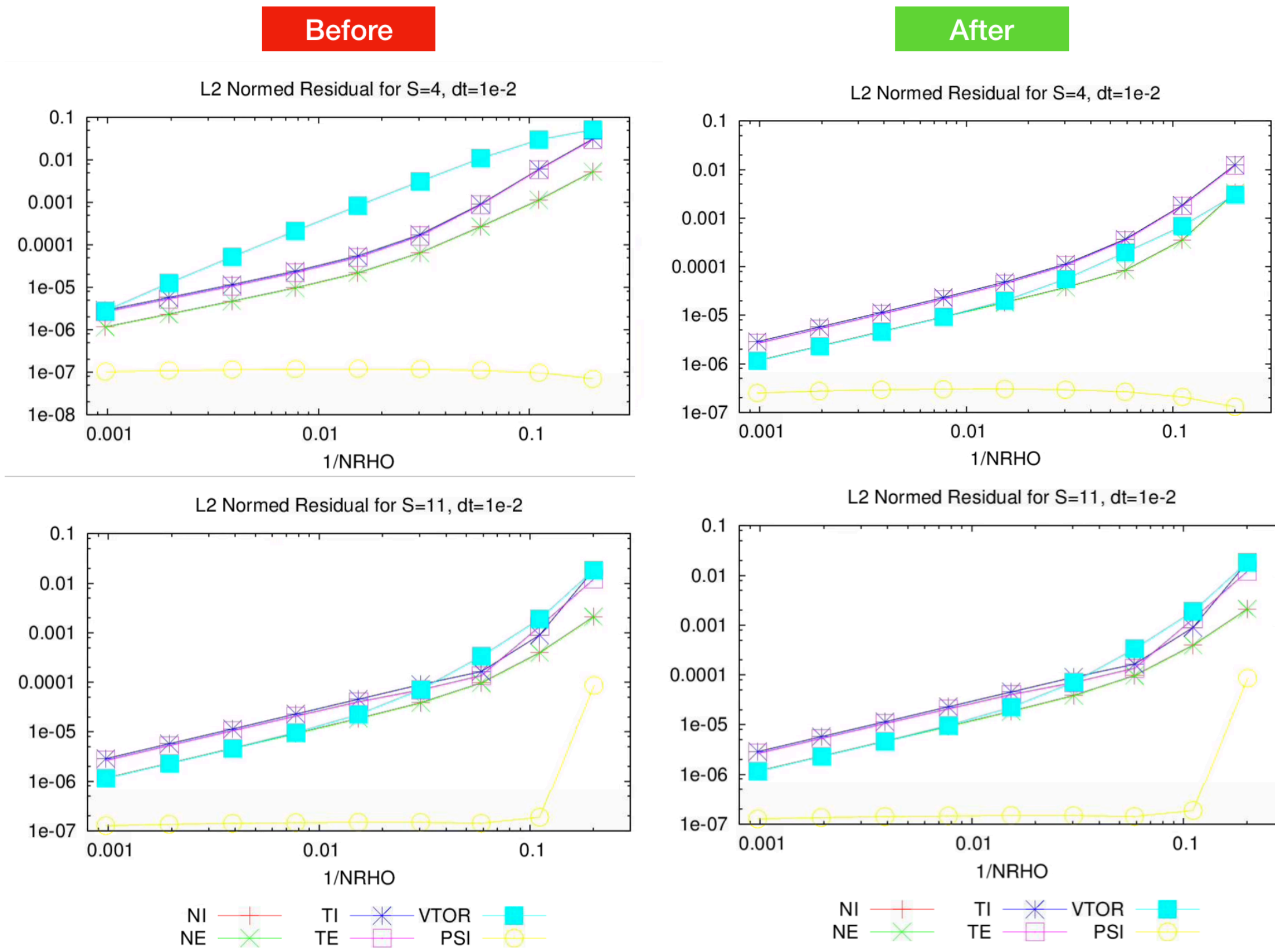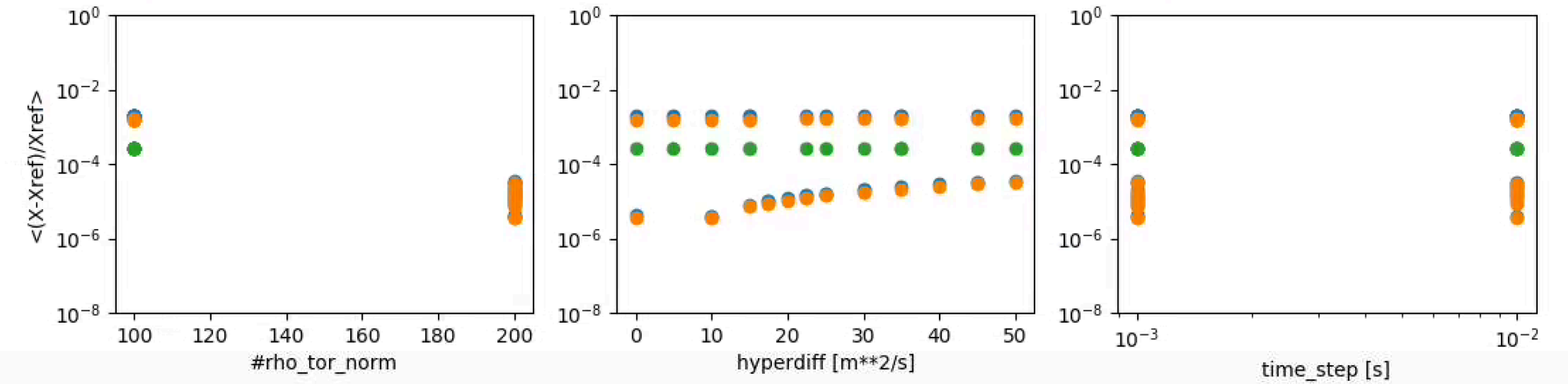
ETS-5 progress (JF)

without cutoff

based on JET #94442 data for 6s of simulation time. Simplified transport model (constant) with ETB rho > 0.9
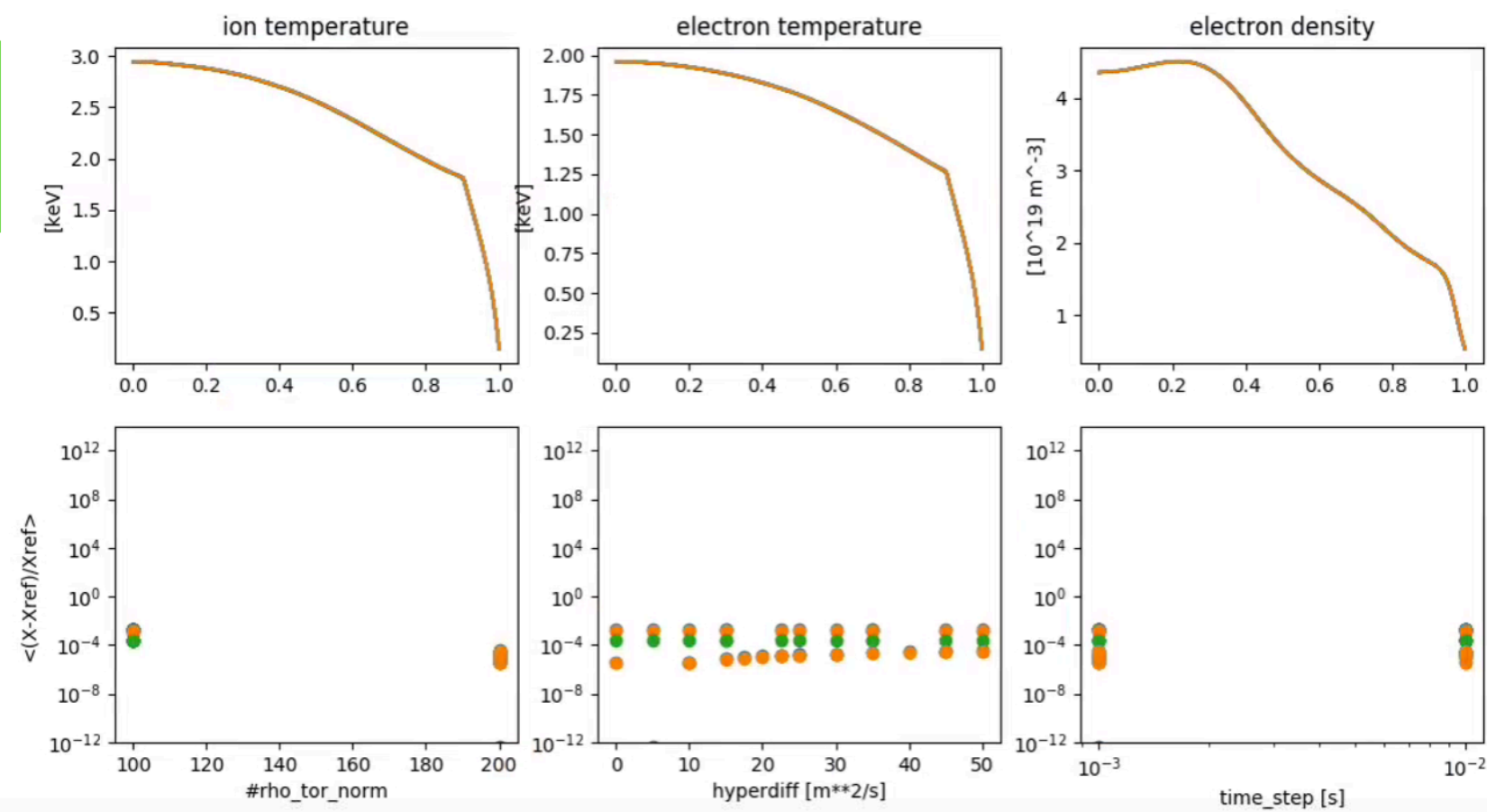
with cutoff rho>0.8

- hyper-diffusion issues fixed by applying a cutoff for rho_tor_norm > rho_cut (commit > ETS5/R2210)

- parametric scan for dt, #rho_tor_norm and hyper-diffusion (explicit)

ETS-6: now in GIT

- Thanks to the efforts of Karel van de Plassche, ETS-6 is now in GIT!
- Renamed to ets_core
- Number of branches (snapshot as of Sunday after lunch):
  - * develop
  - master
  - remotes/origin/HEAD -> origin/master
  - remotes/origin/IPramp
  - remotes/origin/core_profiles_consistency
  - remotes/origin/database_profile

- remotes/origin/database_profile_thomas
- remotes/origin/develop
- remotes/origin/ets_init_select_edge
- remotes/origin/master
- remotes/origin/revert_transport_solver
- remotes/origin/thomasFromSvn

- If you are a developer, base your work off of "develop"
  - **Discuss your proposed changes in the wimas-2 channel of slack**

ETS-6 progress

- Thomas Jonnson
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Thomas_Jonsson
    - ets_core - Actors for the ETS-6
    - ETS-6 workflow
    - Documentation
- Dmitriy Yadykin
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Dmitriy_Yadykin
    - New dressed release
    - ETS-5 / ETS-6 comparison

- Jorge Ferreira
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#ETS6
    - Worked on predictive current diffusion modelling of a full JET discharge (ramp-up/flattop/ramp-down) [still in progress]
- Seppo Sipilä
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Seppo_Sipil.C3.A4
    - Worked on getting ASCOT4-RFOF to run in a workflow with ICRH [still in progress]

ETS-5 progress (SS)
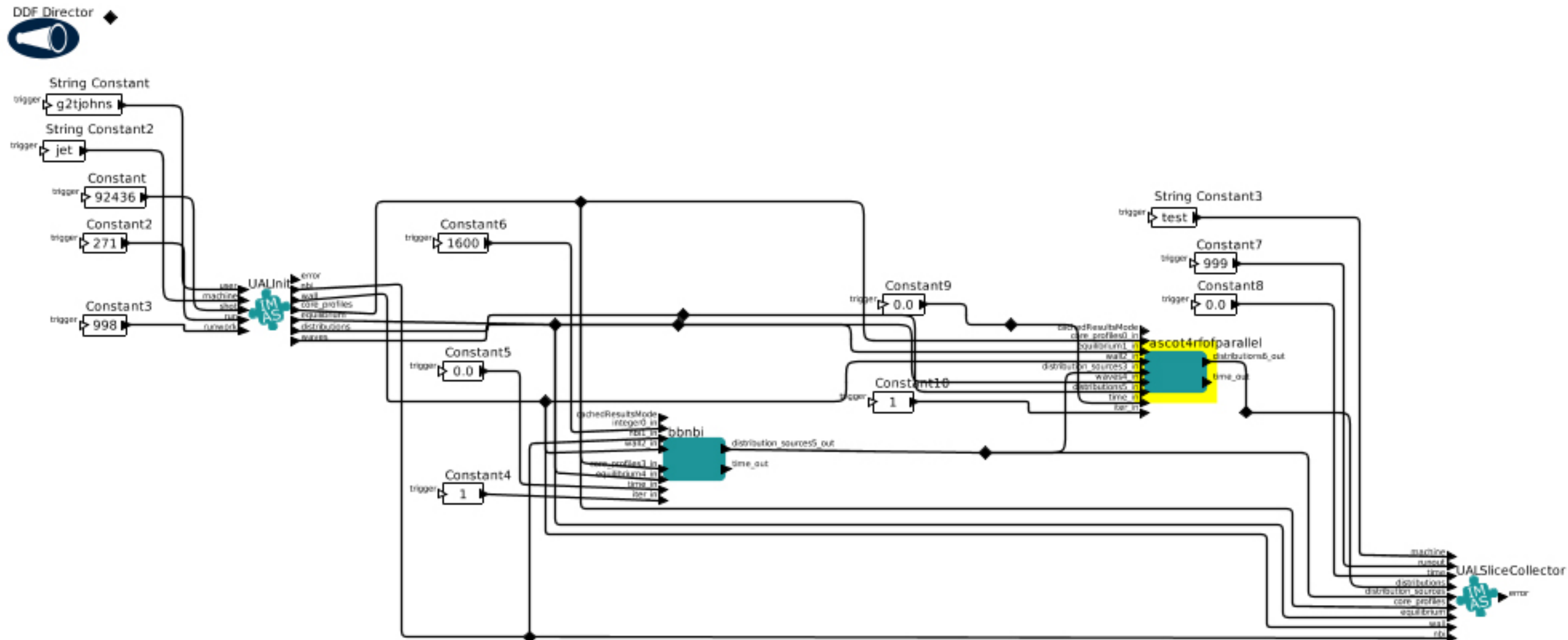
ETS-6 progress

- Nathan Cummings
  - https://users.euro-fusion.org/iterphysicswiki/index.php?title=WIMAS-1/2/3/4_WS&action=submit#Nathan_Cummings
    - Validation of ITER scenarios
    - Identified scenario shot file provided by Mireille Schneider.

- Used Thomas' 'first aid' script to ensure scenario is compatible with ETS6
- Performed test run evolving electron temperature for a couple of time slices
- NEXT: Document the provenance of this data

ETS-6 progress, core-edge

- Rui Coelho
  - https://users.euro-fusion.org/iterphysicswiki/index.php?title=WIMAS-1/2/3/4_WS&action=submit#Rui_Coelho
    - Builds on previous IMAS versions but much has changed since (that's why i didn't spend that much time on it either...)
    - Sanity checks to make a robust integration....
    - Done.....but not that useful as far as a result is concern. The sanity check worked though (-:

- David Coster
  - https://users.euro-fusion.org/iterphysicswiki/index.php?title=WIMAS-1/2/3/4_WS&action=submit#David_Coster
    - ToDo list for cec core-edge actor (https://gforge6.eufus.eu/svn/coreedge/trunk/IDS)
      - implement codeparam [Done]
      - implement time varying boundary conditions to confirm that the rest of the workflow is seeing the actor
        - done for Te
          - tested with a standalone wrapper and in the ETS-6 Kepler workflow

ETS-5 progress (DC)

Te[500:]-Te[500:].mean(axis=0)
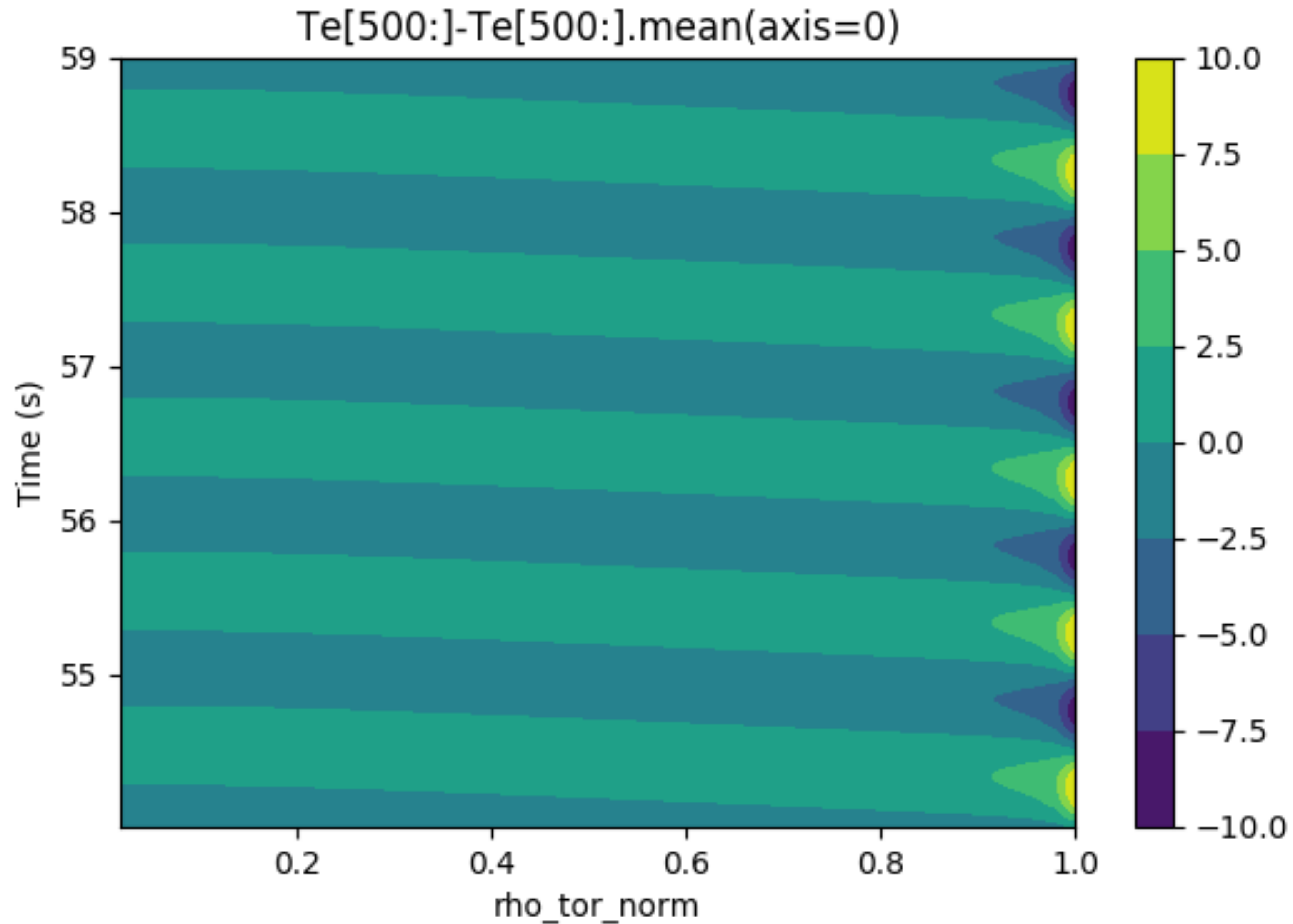
Turbulence workflow

- Anders Nielsen
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Anders_Nielsen
    - Discussion with Michele and Lorenzo Frassinetti, pr. E-mail, for mapping local PPF JET data from LF to edge_profiles IDS. Data only in pre-ELM – discussion about post ELM in the future
    - Selective pre-ELM JET shots from the Isotope campaign (M18-14), 90993, 90998, 90999, 91118, 91123, 91126, will be ported within the next 3 weeks.
    - Ported the latest Git version of HESEL to the Gateway, compiled, link and execute in batch queue checked with help from Michal. Created lib-file to be used for the wrapper

- Compiled, linked and execute the HESEL wrapper so it can run it the simplified FORTRAN WF from last year, with help from Michal.
- Obtained a first draft of the TURBULENCE workflow from Rui. Te and ne located in thomson_scattering ids and Ti located in charge_exchange ids all in a R,Z coordinate system. Also, equilibrium and edge_profiles ids's are used in HESEL
- Discussions with Rui about the design of the WF, e.g. display options
- Discussion with David about porting AUG data to ids database using shotfiles from AUGped. Python script obtained for performing this porting myself, read_PED.py.

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Turbulence workflow

- Rui Coelho
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Rui_Coelho
    - Develop the TURBULENCE workflow for team Anders
    - Assumes equilibrium + edge_profiles on input
    - Maps the data to thomson_scattering + charge_exchange on user prescribed l.o.s.
    - Stores all IDS (equilibrium, edge_profiles, thomson_scattering, charge_exchange, turbulence) to output run.
    - DONE: plot flux map + kinetic profiles long l.o.s. with time stamps and workflow wait for Python (emergency stop assistant)

- Michele Romanelli
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Michele_Romanelli
    - Focus on providing JET edge_profile IDS for WIMAS-3
    - Discussed with WIMAS-3 team the presentation of Lorenzo at the Thursday seminar.
    - Added list of IDS required by WIMAS-3 in EWE-1 wiki page.
    - Asked Lorenzo to provide Frederic with the list of PPF's for the edge_profile IDS.
      - Frederic will get this implemented in the UDA mapping.
      - Lorenzo will provide the list by next week.
    - Discussed with Lorenzo the possibility to have post-ELM profiles representative of the L-mode phase of the discharge.
      - Lorenzo said this is possible and can be done in 2-3 weeks.
        - I shall keep in touch with Lorenzon on this.
    - I shall now explore the possibility to add extra experimental data in IMASgo to carry out the edge_profile fitting.

Turbulence workflow (RC)

Welcome to the HESEL EDGE TURBULENCE WORKFLOW v1.0

Features :
- Reads AUG shotfile database (equilibrium, edge_profiles)
- Maps the experimental fit data to (R,Z) line of sight of thomson_scattering and charge_exchange
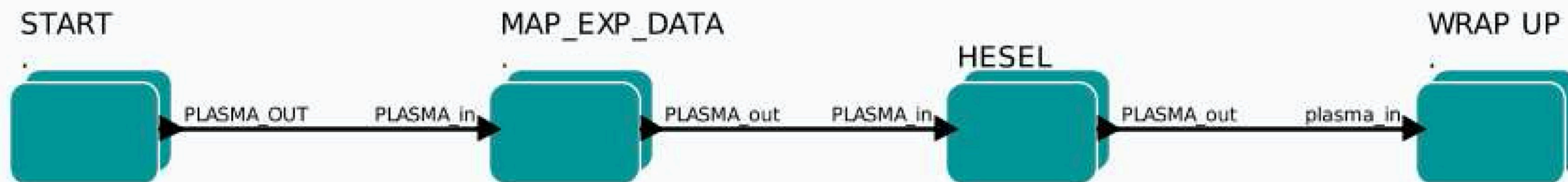- Evaluates SOL turbulence with HESEL code

Running the workflow :
- Set imasdb parameters in the START actor
- Set l.o.s. for virtual thomson_scattering and charge_exchange in MAP_EXP_DATA actor
- Merged equilibrium+edge_profiles+thomson_scattering+charge_exchange+turbulence are collected.

CREDITS
Workflow + data management scripts : Rui Coelho
HESEL actor : Anders Nielsen

DDF Director

START   MAP_EXP_DATA   HESEL   WRAP UP

PLASMA_OUT   PLASMA_in   PLASMA_out   PLASMA_in   PLASMA_out   plasma_in
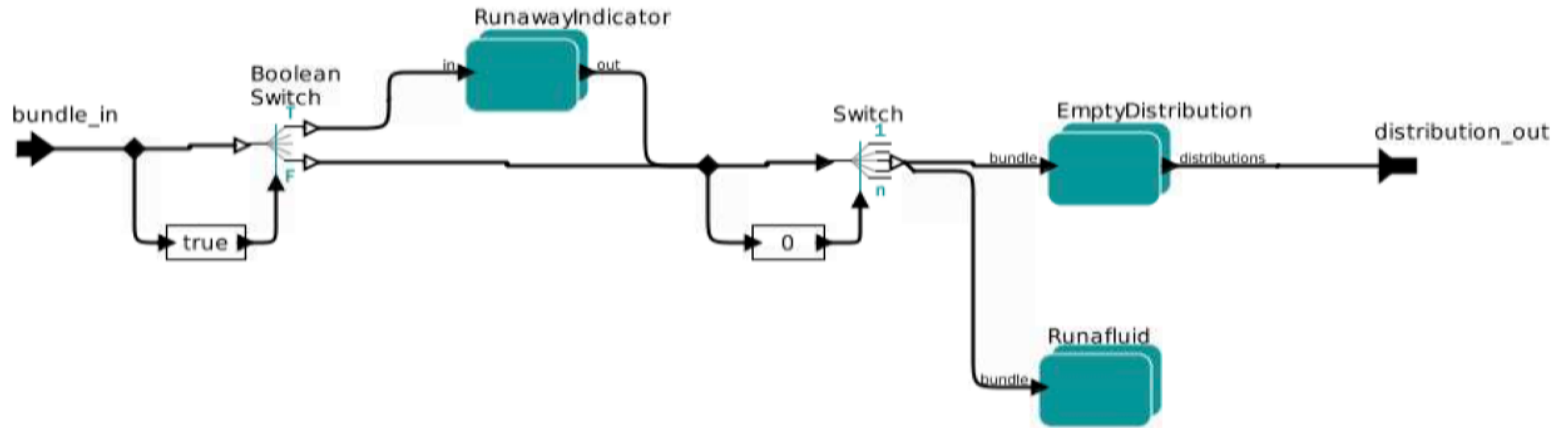
Runaway electrons

- Gergo Pokol
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Gergo_Pokol
    - Install Runaway Indicator actor into ETS6
      - Handling of code parameters was discussed with Thomas, IMAS environment misses some functionality, Soma generated a ticket on this. (Details at Soma)
      - Optimal placement of the indicator actors was discussed with Thomas and Dmitriy. Foreseen functionalities and corresponding solutions:
        - Runaway electron calculation in a perturbative manner, independent of any other electron distributions (works for Runaway Fluid and kinetic codes) --> Dedicated distribution occurrence defined for runaway electrons

- Runaway electron calculation using the electron distribution function from H&CD codes (works as an option for kinetic codes) --> Place Runaway composite actor after the H&CD Distributions
- Calculation of runaway and H&CD physics in the same kinetic code (works for e.g. LUKE) --> For this purpose, the actor should have an instance parallel to the electron H&CD codes, and a logic should be implemented to switch off any further runaway modules.
- Runaway current should be considered az a non-inductive current in the current diffusion equation. (Task for the future, no difficulties are foreseen.)
- Should have the option to provide resistivity from the kinetic codes into the current diffusion equation. (Task for the future, no difficulties are foreseen.)

Runaway electrons

- Soma Olasz
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Soma_Olasz
    - Install Runaway Indicator actor into ETS6
      - Implementation of code parameters into Runaway Indicator in the IMAS version of the actor is in progress.
        - Tracker opened on issues with this: https://gforge6.eufus.eu/gf/project/generalsupport/tracker/?action=TrackerItemEdit&tracker_item_id=1697&start=0
      - Release a new IMAS and ITM version of the actor

- The ITM release will be done with the IMAS version. The state of release can be found here: https://github.com/orgs/osrep/projects/14
- The IMAS release will be done once the code parameters are implemented. The state of relese can be found here: https://github.com/orgs/osrep/projects/16
- Put Runaway Indicator into ETS6
  - After discussion with Thomas and Dmitriy, we have decided to put only the new version into ETS6. The location has been agreed on.

Runaway electrons (SO)

CHERAB

- Gergo Pokol
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Gergo_Pokol
    - Solve critical questions on the way to produce a Kepler actor from CHERAB
    - Started to collaborate with the Ljubljana group, as they are using CHERAB and Raysect in SMITER.
    - Python package management strategy was discussed including CPT, corresponding Jira ticket created: https://jira.iter.org/browse/IMAS-2944
- Asztalos Ors
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Asztalos_Ors
    - ToDo list:
      - Get CHERAB operational on gateway and itercluster
      - Work on BES actor
    - So far:
      - Started collaboration with the Ljubljana group (M. Brank and L. Kos) on CHERAB - IMAS operations efforts.
        - SMITER is planning to use CHERAB as a tool in IMAS
        - CHERAB tools used for BES synthetic diagnostics on IMAS overlap significantly with those to be used in SMITER
        - A general CHERAB IMAS package is being developed based on and continuing the cherab-iter package (https://git.iter.org/projects/DIAG/repos/cherab-iter/browse) in collaboration with the Ljubljana group
      - Running CHERAB on gateway and itercluster.
      - CHERAB / Raysect and Renate-OD were installed and compiled on the gateway.

- Basic demos of the codes in question are operational.
- Compiled cherab-iter module, tested. Does not work. Is being fixed.
- Created ticket to grant writing access to CHERAB - ITER git for Asztalos, Brank and Pokol. (https://jira.iter.org/browse/IMAS-2950)
- Kepler workflow vs. Python workflow
- Renaming CHERAB-ITER to CHERAB - IMAS for obvious reasons.
- We had issues with the python environment. Basic code functionality is OK, higher level stuff lacks packages. (With CHERAB we had this issue for quite some time.)
  - Quick fix is for user to pip install (not a long term solution).
  - Tickets can be made to request the addition of package to default environment (not preferred)
  - Discussion was had on the possibility of setting up virtual python environments in Kepler actor or possibly within python workflows as well. (https://jira.iter.org/browse/IMAS-2944)
  - Virtual environment testing is underway.
- Matic Brank
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Matic_Brank
    - Started to collaborate with BME group (Gergo Pokol and Ors Asztalos) on development of CHERAB_ITER package
    - Managed to install cherab_core on ITER Cluster with Ors
    - cherab_core test cases run successfully on ITER Cluster

CPT!

- Michal Owsiak
  - https://users.euro-fusion.org/iterphysicswiki/index.php/WIMAS-1/2/3/4_WS#Michal_Owsiak
    - Issues
      - /tmp overloaded by import_actor function - https://gforge6.eufus.eu/gf/project/generalsupport/tracker/?action=TrackerItemEdit&tracker_item_id=1700&start=0
      - ascot4rfofParallel IMAS actor: MPI not initialized properly - https://gforge6.eufus.eu/gf/project/generalsupport/tracker/?action=TrackerItemEdit&tracker_item_id=1699&start=0
      - HESEL code - small fixes related to env. settings
    - developments
      - Need help with C++ code parameters in IMAS - https://gforge6.eufus.eu/gf/project/generalsupport/tracker/?action=TrackerItemEdit&tracker_item_id=1697&start=0
        - MultipleTabDisplay - already released within Kepler release prepared by Dimitriy
        - Kepler and read-only version - first release was already tested
        - UALClose - fixed version with output port
      - discussions
        - discussion related to Python/Kepler separation inside FC2K
        - discussion related to Catalog QT
        - discussion related to Python integration inside ualpython (tracker IMAS-2944)
      - small issues
        - as usual, small issues with env. etc.
      - varia
        - Sharing NoMachine session at Gateway: https://docs.psnc.pl/display/WFMS/Sharing+NX+sessions

Do we want to use the same (or similar format) for other planned WPCD events?

- EWE-1/2/3/5 WS, Apr 27 -1 May, Home / Office - Zoom, EWE Team

  - Cannot take place as a face2face meeting

- Summer General Code Camp, June 8 - 19, DIFFER, Eindhoven, All

  - At least theoretically possible that this might still occur as a face2face meeting (*not absolutely impossible yet*)

Many thanks to Anders for organising the Virtual Working Session!