



Welcome to the EQRECONSTRUCT workflow in IMAS v0.1 !

RECONSTRUCTION

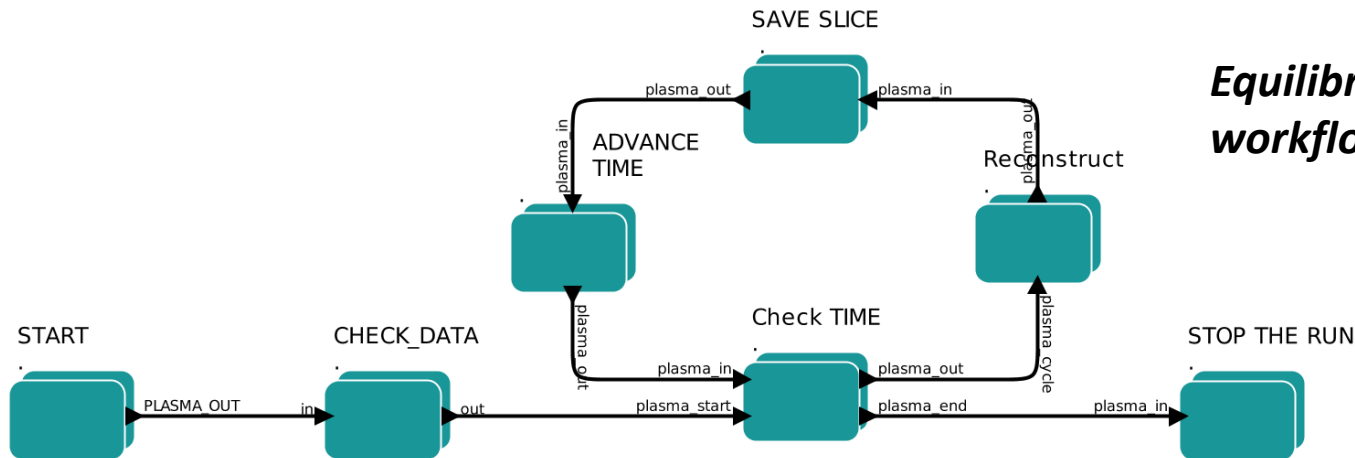
- Start from an imasdb with just experimental data from diagnostics.
- Select the time of interest ("time_begin", "time_end" and "time_dt" variables).
- Reconstruct equilibrium using EQUAL, (NICE, EFIT++ or CLISTE) codes.
- Plot the reconstructed equilibrium (flux mapping and profiles "Visualise_FBE").

DDF Director



REFINEMENT

- Cut-off the reconstructed eq. ("cut_eq") at a given percentage of the separatrix flux ("cut_off").
- Calculate high res. equilibrium with codes : HELENA, CHEASE and CAXE.
- Plot the equilibrium flux map and profiles ("Visualise_HRE")



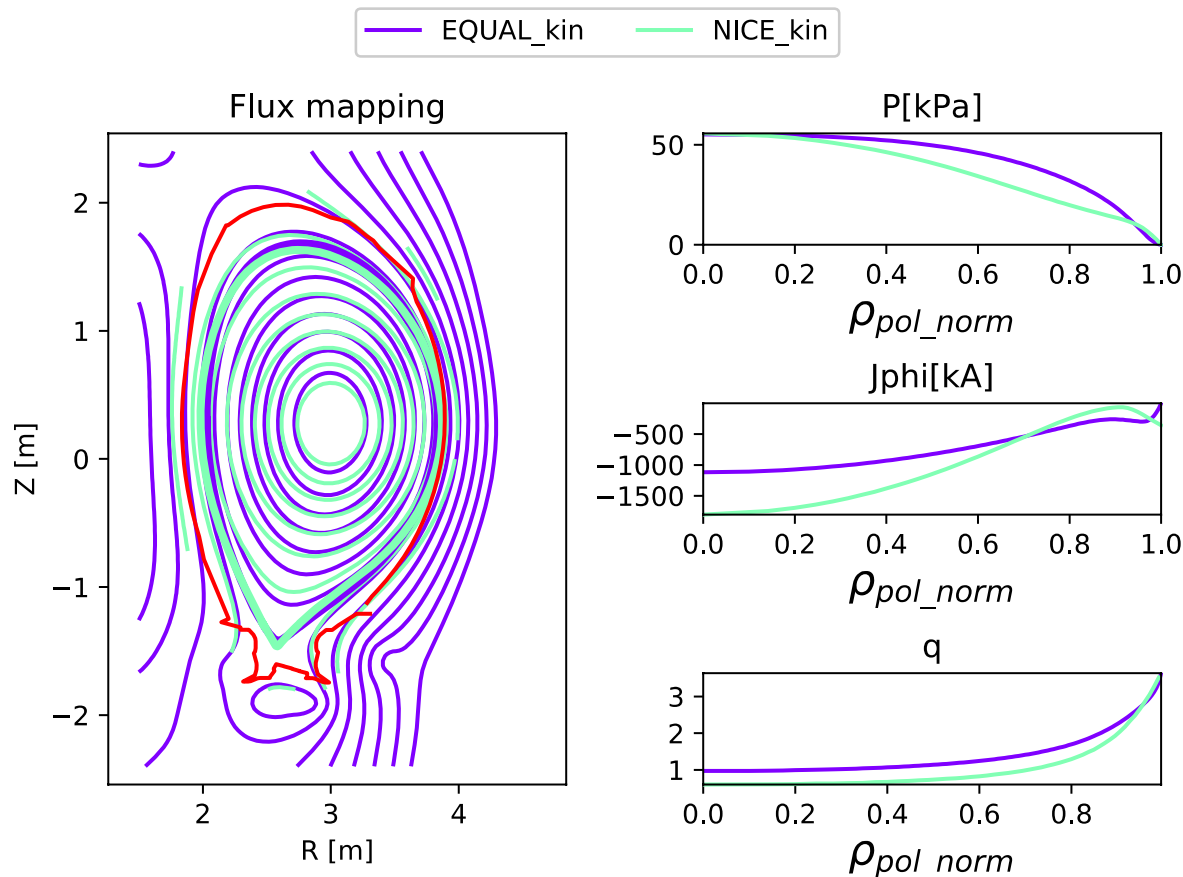
Equilibrium reconstruction workflow

- Workflow extended to include pressure constrained equilibrium.
- Tested with EQUAL on JET #84600 in $t=[47-52]s$

Pressure constraint in 3.25.0/4.4.0



- Constrain implemented in EQUAL/NICE and tested on JET #84600



W. Zwingmann
B. Faugeras

- Preliminary results using EQUAL and NICE with pressure constraint on JET #84600
 $t=50s \rightarrow$ EQUAL parameters too tight not suitable to capture pedestal.

Testing of EQUAL reconstructions on MAST



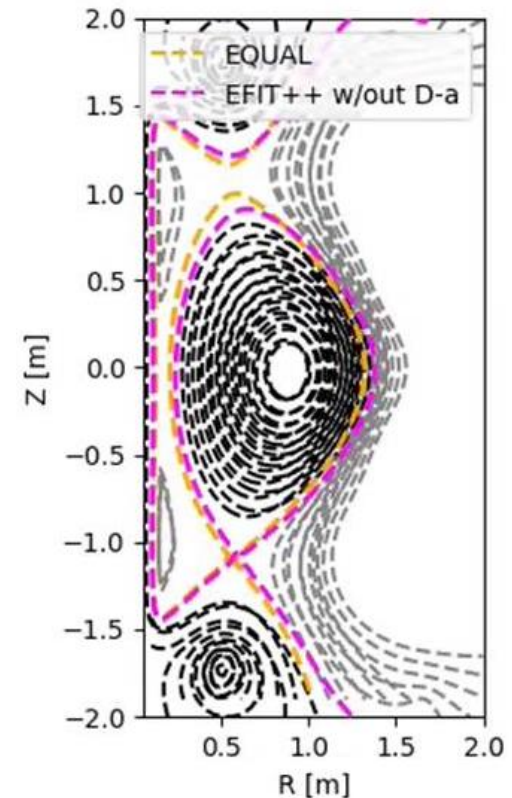
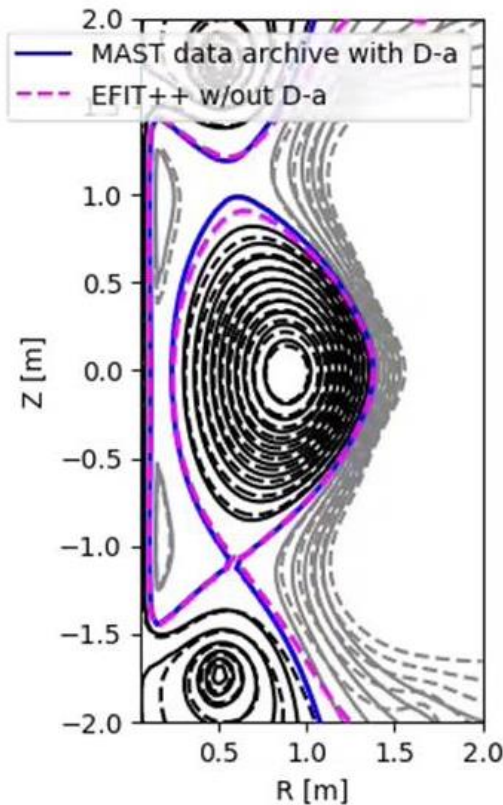
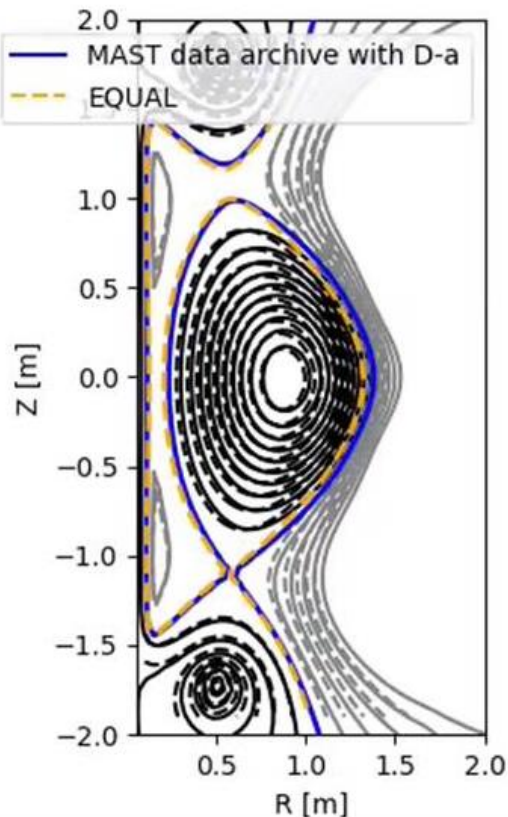
Shot 29852 t=0.2 sec

L. Kogan
W. Zwingmann

EQUAL run by Wolfgang, magnetics-only no pf_passive constraints : g2zwolf, mast, run 21

EFIT from MAST data-archive, magnetics with additional constraint on the outboard position of the separatrix at the mid-plane from the D-Alpha camera: g2lkoga, mast, run 51

EFIT++ magnetics-only run on UKAEA systems & dumped into IDS on gateway: g2lkoga, mast, run 200



CLISTE integration



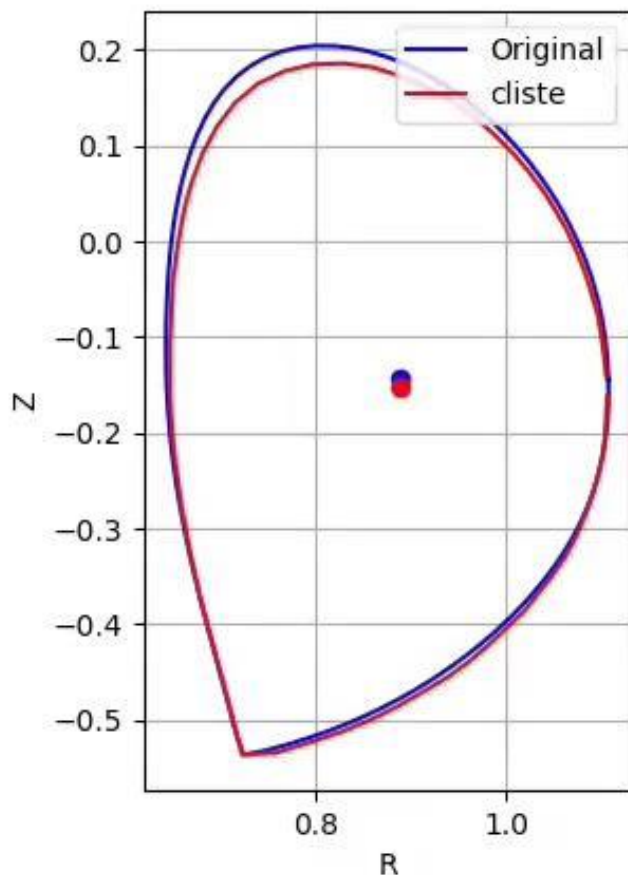
- Python3 driver to launch CLISTE now available (private github for now) → migrated from *CPO* to *IDS*.

E. Giovannozzi

M. Dunne

P. McCarthy

- *TCV #51262 at t=0.75 (LIUQE vs CLISTE)*



- *Some cocos issues still to be solved.*
- *Wrapper updated to single time slice input (input parameter) → easily integrated in a time loop workflow*



- How to cast best induced currents inside passive conductors ?
 - *Discretised wire* current mesh vs *Fourier moments*...
- Pros and cons...
 - *Fourier moments* allows to capture smooth and connected behaviour of induced currents inside conductors e.g. the vessel
 - *Discretised mesh* implies reconstructed currents will all be independent and this is just *WRONG* !
- Is the Data dictionary adequate “as is” ? → *No*
 - Pf_active is just not adequate (not active coils !)
 - Pf_passive has limited (20) number of elements per loop...and each fourier eigenmode would be cast as a “loop”.....not very clear right ?
 - Ongoing JIRA tracker IMAS-3068.



Equilibrium and linear MHD workflow

Welcome to the EQSTABIL workflow v0.1 in IMAS !

Present version features :

- Start from a free bnd reconstructed equilibrium or fixed bnd equilibrium.
- Selection of the time of interest ("time" variable).
- Cut-off equilibrium (when starting from free bnd reconstructed) -> specify cut-off ([0..1]) w.r.t. separatrix flux.
- Refine equilibrium with HR codes : HELENA, CHEASE, CAXE
- Calculate linear MHD stability (eigenfunction+eigenvalue) for a given toroidal mode number with MHD codes : ILSA, MARS, KINX
- Interchangeability between HELENA and CHEASE when using ILSA and MARS codes.
- Plotting of equilibrium flux map and profiles and MHD eigenfunctions (Real and Imaginary of radial displacement)
- Display in Display Dialog the output fag of the MHD code (0: successful, negative: not converged, positive: internal error)

DDF Director



- Tested “on the fly” by L. Kogan on MAST #29880, from imported EFIT data (UDA)

To do list (*as anticipated for the WS*)



- Test preliminary ***tcv2ids*** enhancement that includes `thomson_scattering` (*note on WS report*) → TCV kinetic assisted plasma reconstruction.
- Test private PPF extension of UDA (*S. Dixon*)
 - Needs environment variables setting inside Python script (!)
 - Not tested yet by the team since private build lacks modules e.g. `Mds+` (!)
 - Update `/tags` with most recent EQUAL/NICE code versions
- EQUAL with passive structures