



EFDA

EUROPEAN FUSION DEVELOPMENT AGREEMENT

Task Force
INTEGRATED TOKAMAK MODELLING

14/09/2010

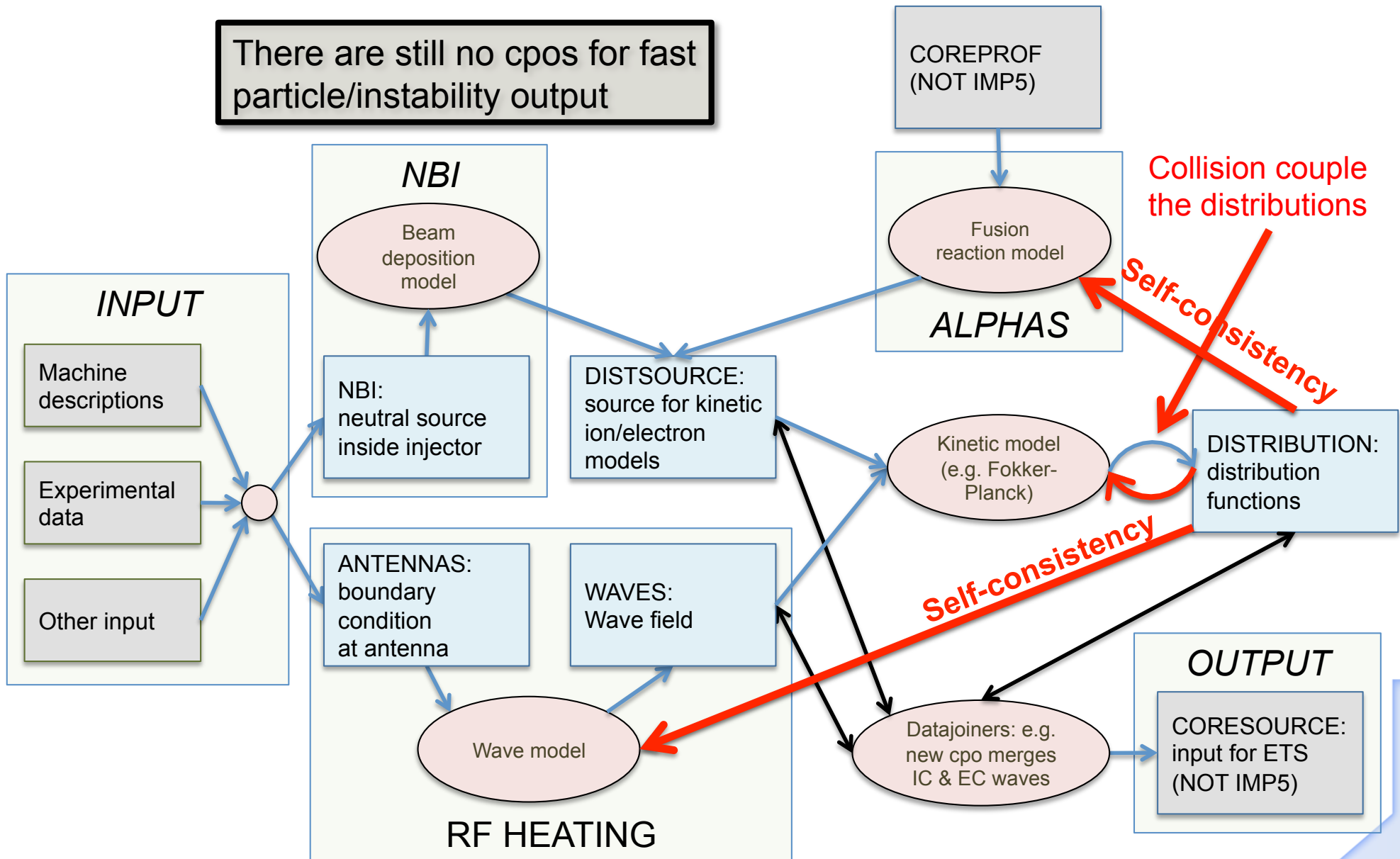
IMP5 CPOs

T. Johnson

- Overview of IMP5 CPOs
- Bugs & examples
- What's new 4.08b?
(ready to be release after meeting - no official date)
 - ✓ New feature: structures containing arrays of structures
 - WAVES is test case
 - ✓ Arbitrary variables and unstructured grid available for 2D quantities in WAVES

IMP5 cpos

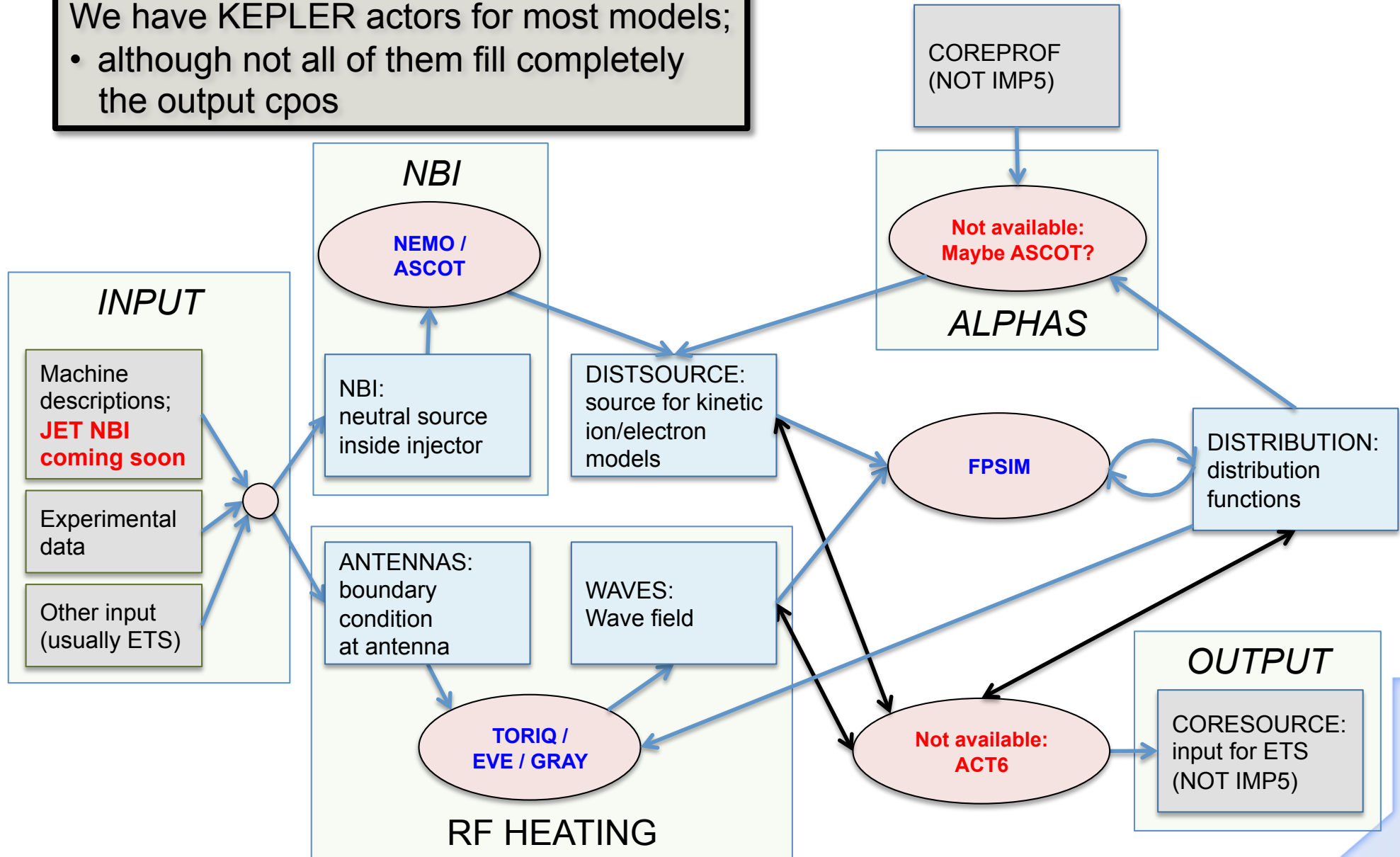
There are still no cpos for fast particle/instability output



IMP5 cpos (my interpretation)

We have KEPLER actors for most models;

- although not all of them fill completely the output cpos



Bugs & examples

CPOs for testing

- When testing that your code can read CPOs; then you need examples
 - ✓ You may *not* find what you need (some fields missing / no CPO exists)
 - ✓ You may even be the first person to use these cpos!
- If not, then you should either
 - ✓ write test-routine **yourself** that fill your input cpo
 - please share your routine/template cpo!
 - ✓ or contact IMP5 Leadership; we'll ask someone to do it for you – not recommended!

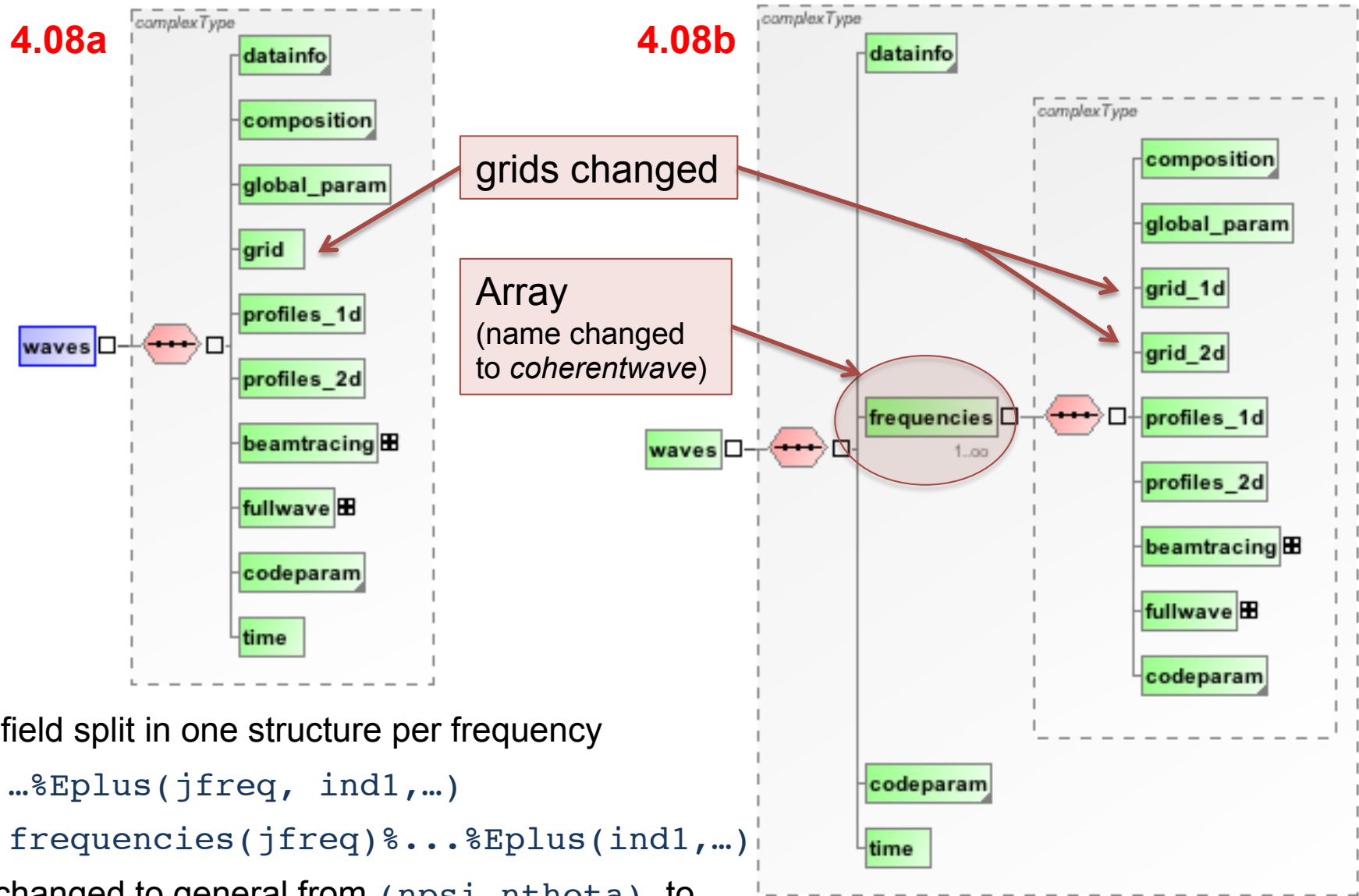
Bugs or bad design

- There will be mistakes in the CPOs!
 - ✓ Please let us know when you find them!
- If there's something you don't like in the cpos; let us know!
- **We** are IMP5 and we have to make this work **together!**

What's new 4.08b?

- Next revision is 4.08b; ready to be release after meeting (no official date)
- 2D spatial grids in WAVES:
 - 4.08a grids (`psi, theta`)
 - 4.08b grid in arbitrary coordinates (`dim1, dim2`)
 - 4.08c will include new 2D grid for DISTSOURCE and DISTRIBUTION
- New feature “**arrays of structure**”
 - IMP5 cpo WAVES was test pilot:
 - In 4.08a datais arrays of frequency index, e.g.
`...%Eplus(jfreq, ind1,...)`
 - In 4.08b the WAVES are split into an array of coherent waves (e.g. one for each RF antenna or EC beam); each one being a structure with properties `Eplus, Epar...`; e.g.
`waves%coherentwave(jfreq)%...%Eplus(ind1,...)`
 - Advantage e.g.: merge waves from ECRH, ICRH into one CPO;
 - 4.08a: copy every field (`Eplus, Eminus...`) separately
 - 4.08b: copy entire "frequency"-structures
- Modified indexing of modules in `waves%antennaslh_setup`
- NBI: Specification of beam injected species simplified

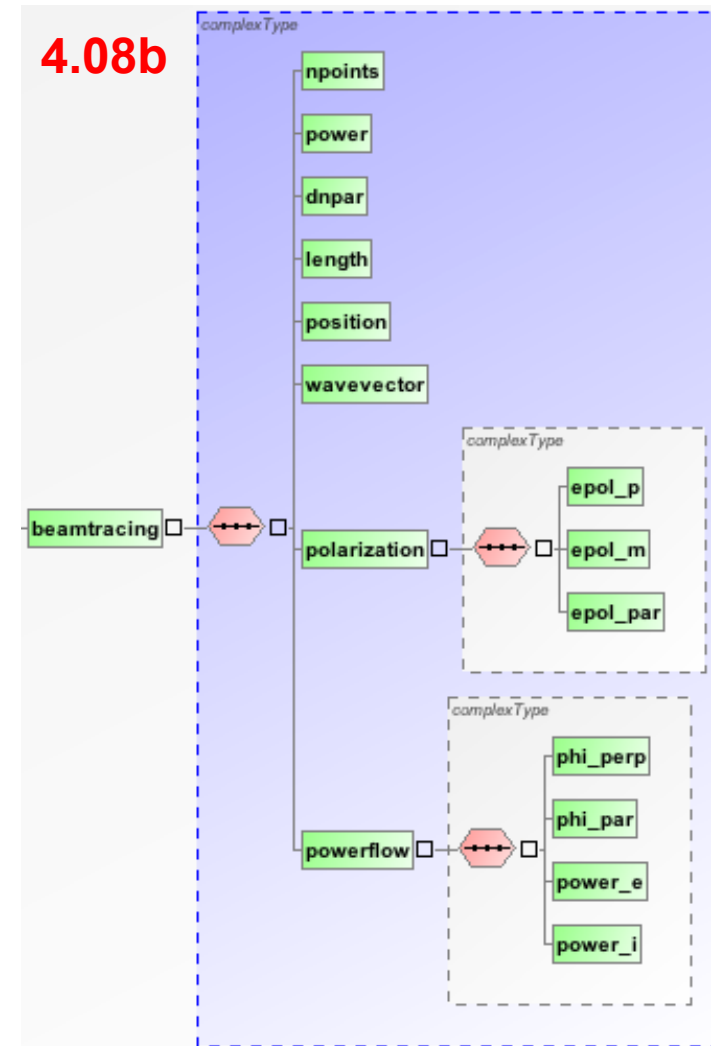
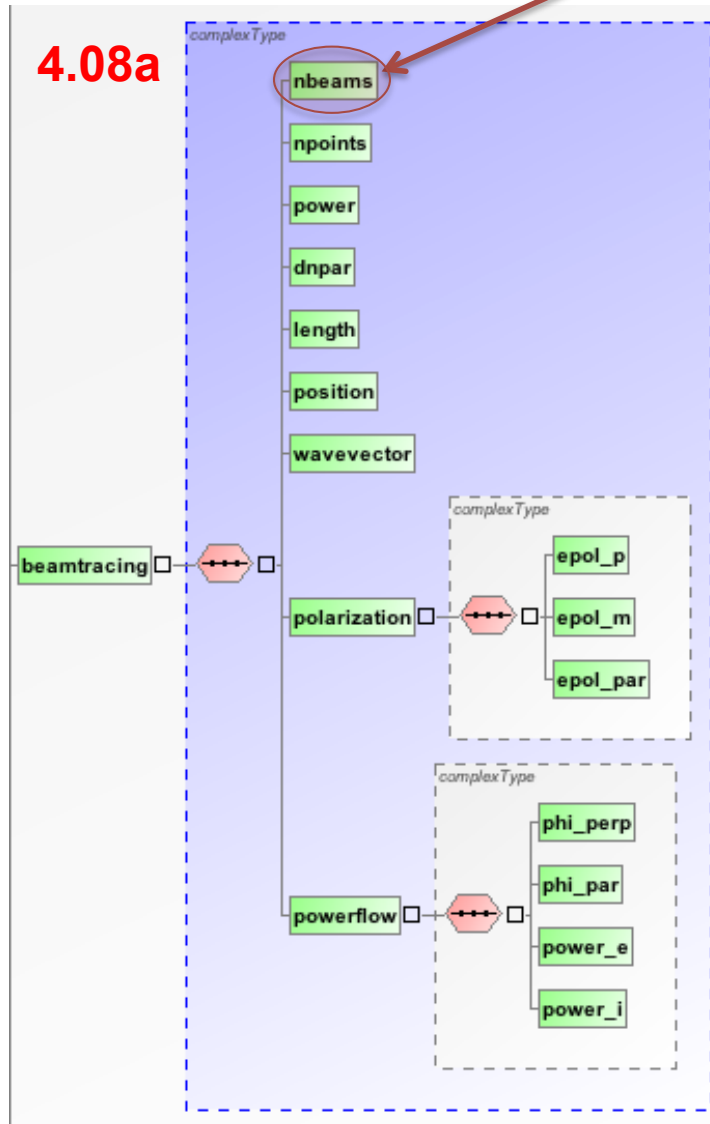
Changes: waves (4.08a / 4.08b)



- In wave field split in one structure per frequency
 - **4.08a:** ...%Eplus(jfreq, ind1,...)
 - **4.08b:** frequencies(jfreq)%...%Eplus(ind1,...)
- 2D grid changed to general from (npsi,ntheta) to general coordinates (ndim1,ndim2)

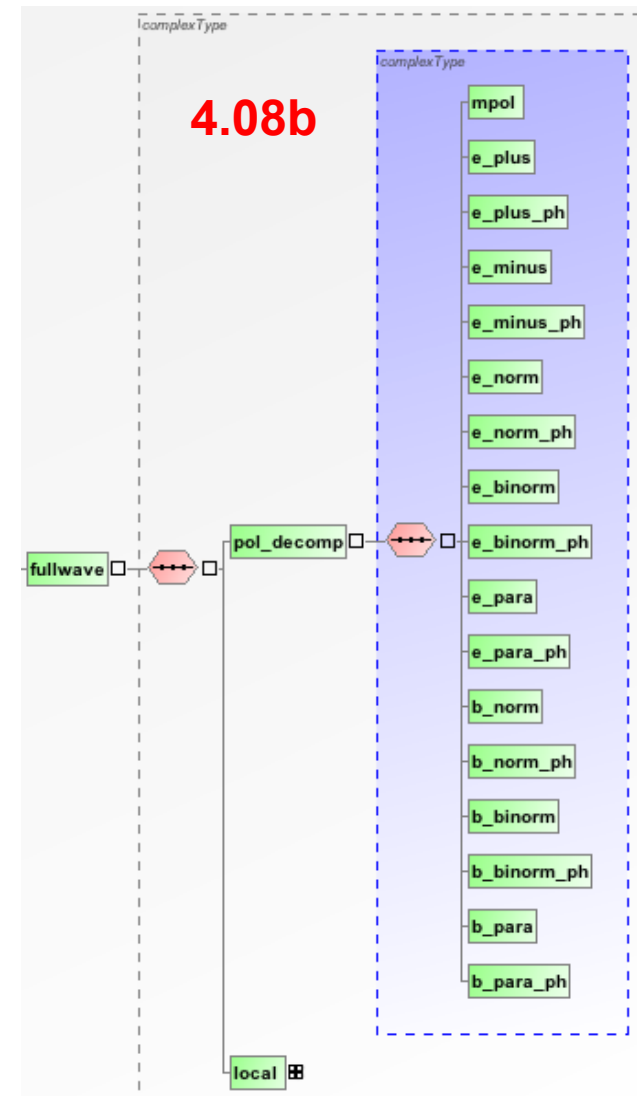
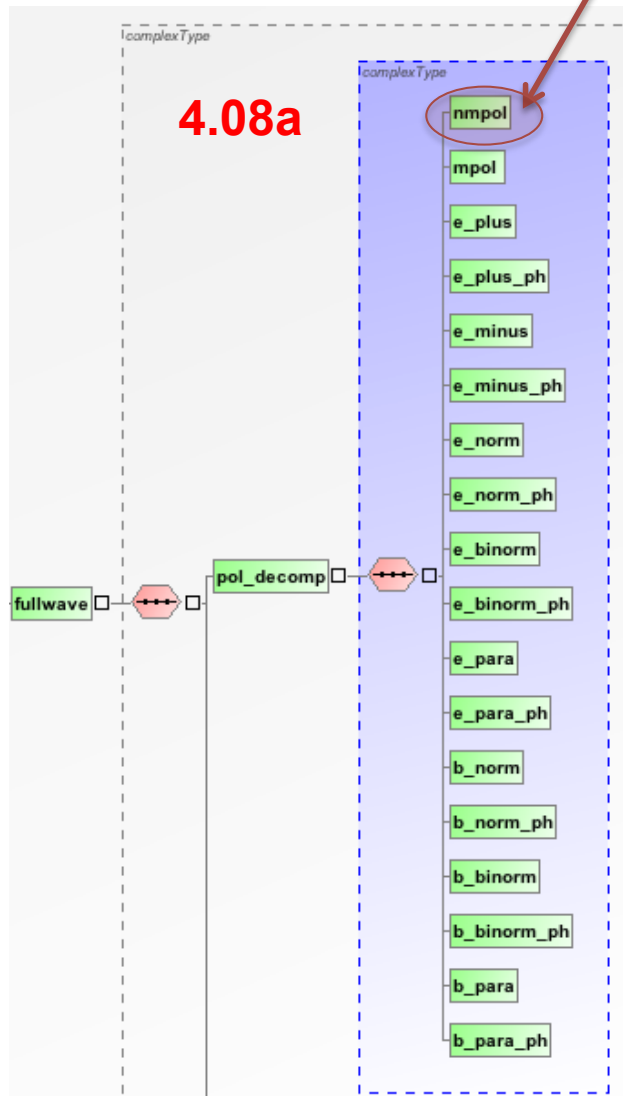
Changes in waves/beamtrace

- nbeams remove in 4.08b;
 replaced by array of frequencies
- all arrays of frequencies removed



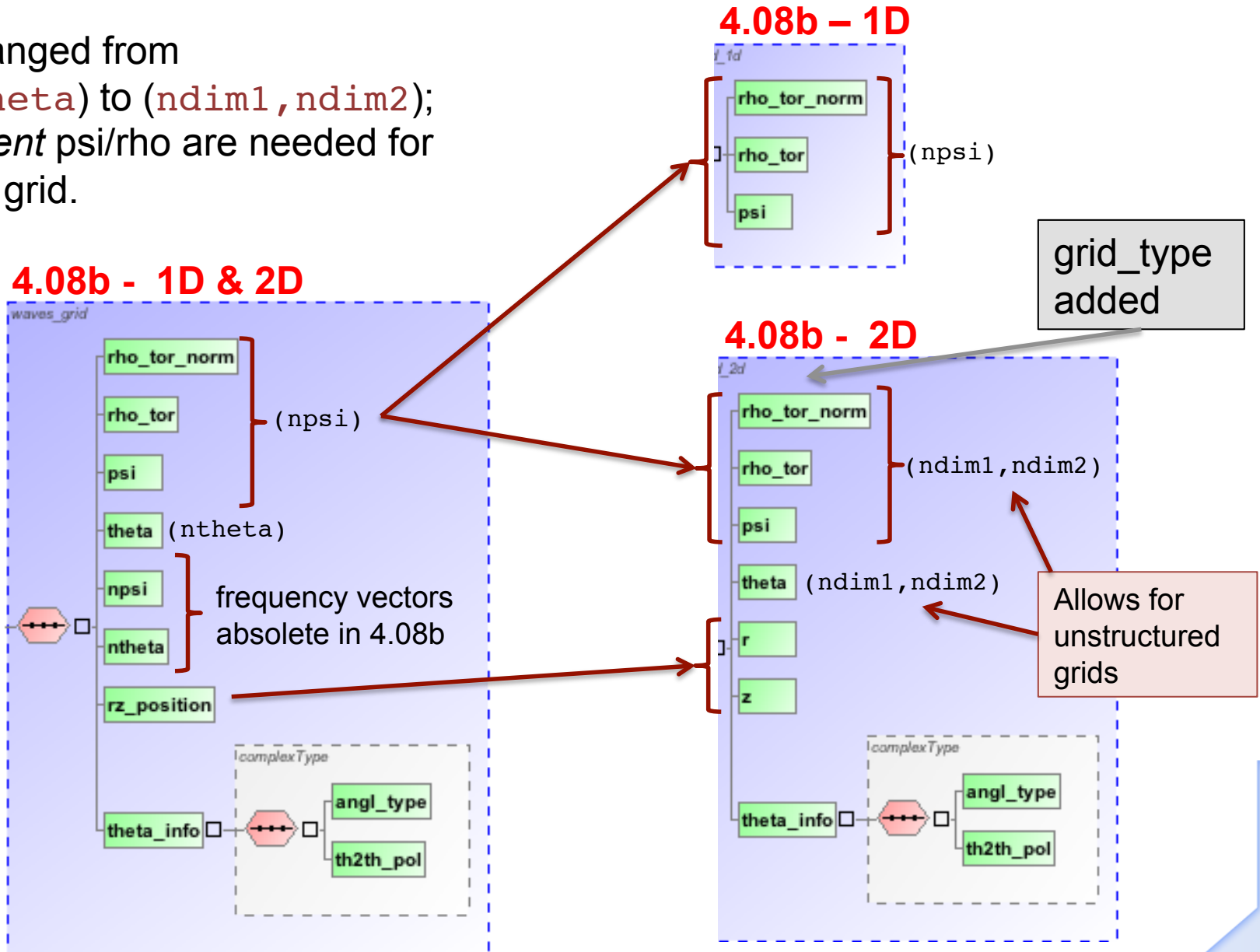
Changed: waves/fullwave/pol_decomp

- `nmpol` obsolete in 4.08b; replaced by `size(...)` (only one frequency; only one mpol)
- all array indexing of frequencies removed



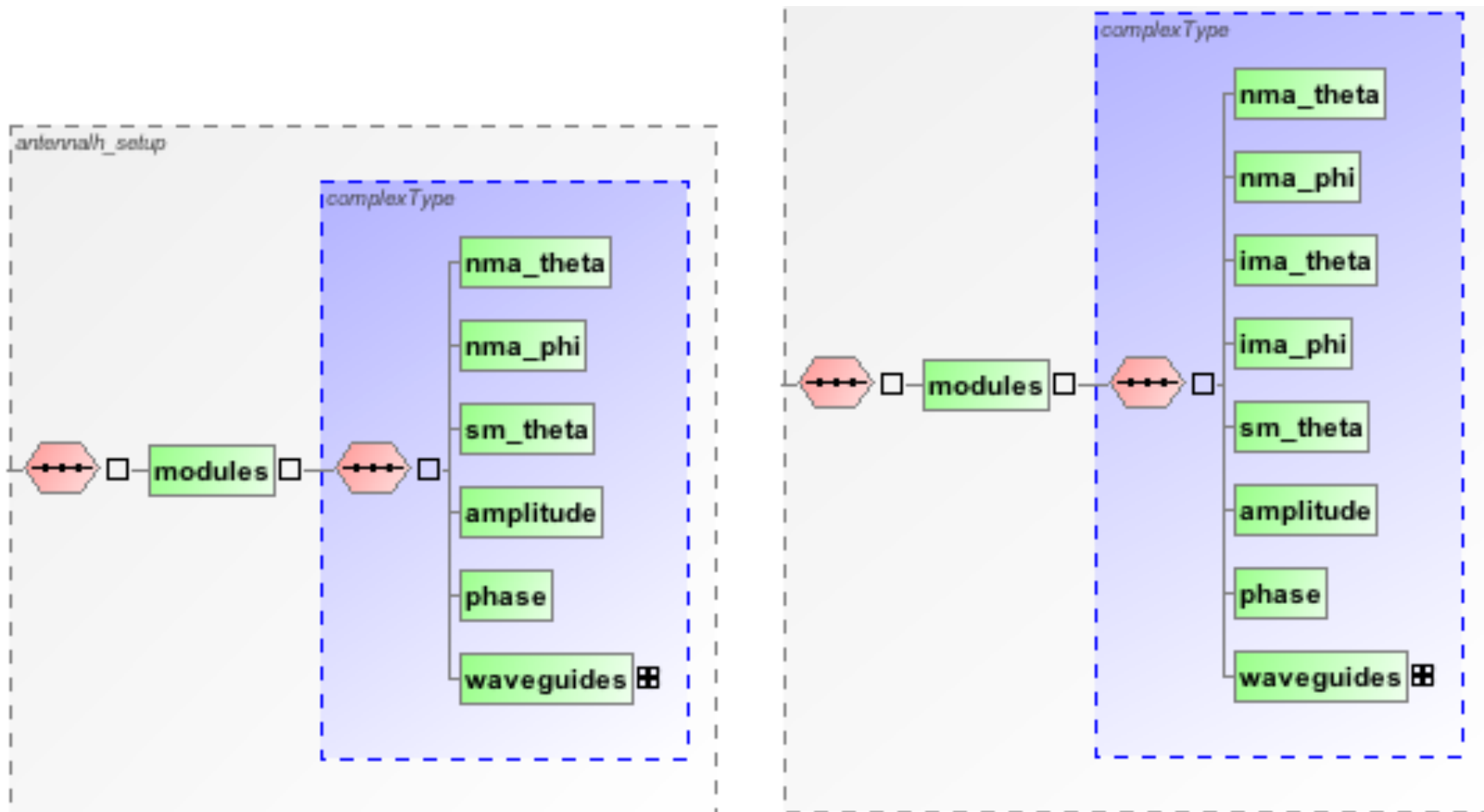
Changes: wave/grid(1d/2d)

- 2D grid changed from $(npsi, ntheta)$ to $(ndim1, ndim2)$;
- Thus *different* psi/rho are needed for 1D and 2D grid.



Changes: waves/antennaLH_setup

- Position index of the module in the poloidal and toroidal directions added
- Dimension of Amplitude/Phase of the TE10 mode injected changed
 - ✓ 4.08a: Array 3D (nantenna_lh,max_nma_phi,max_nma_theta)
 - ✓ 4.08b: Matrix (nantenna_lh, max_nmodules)



Changes: NBI

NBI species description simplified;
 • pointers to the plasma composition removed

