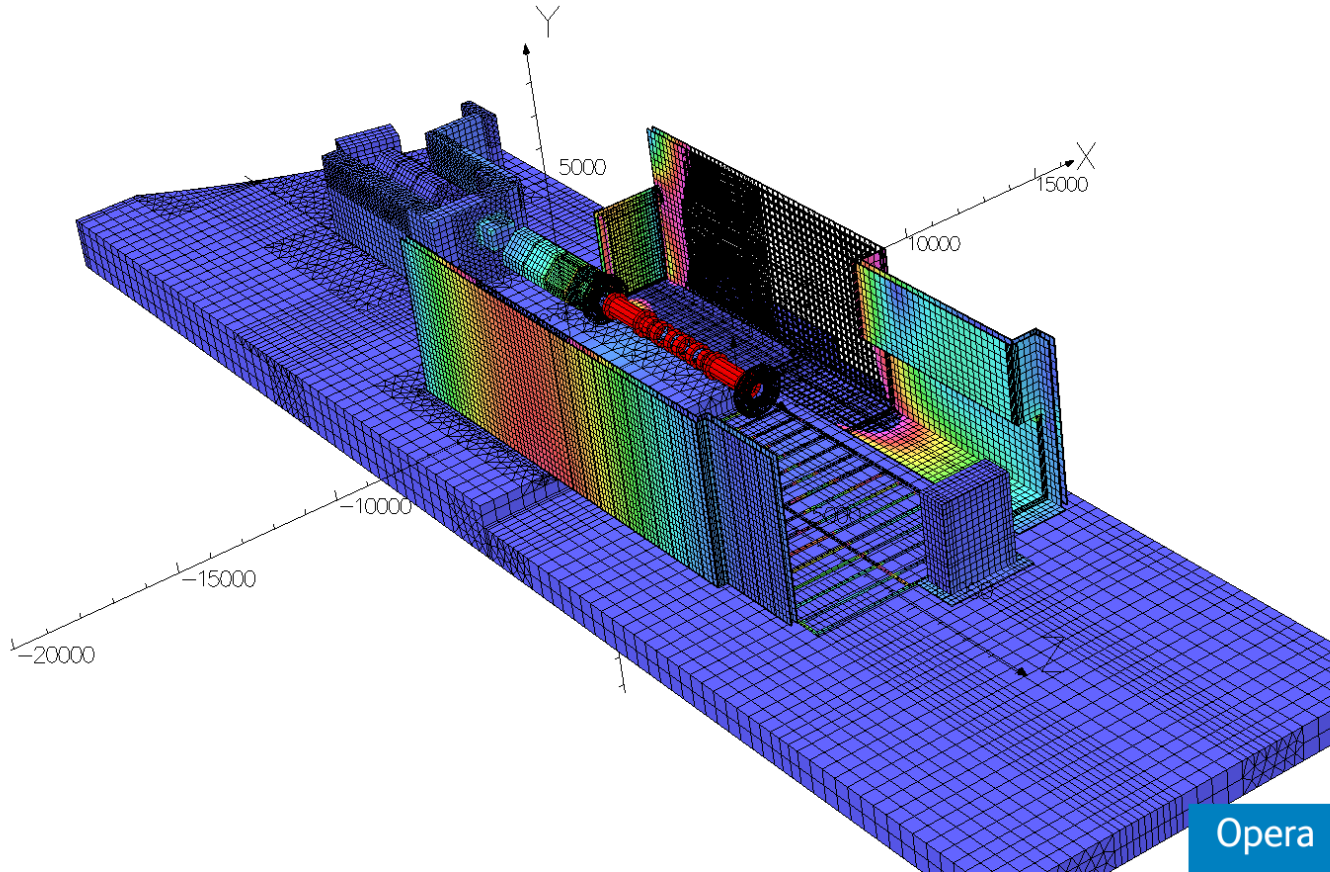
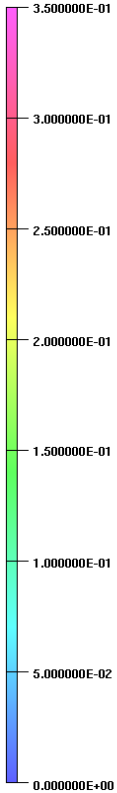


Modelling Update – 26/9/12

26/Sep/2012 13:57:23

Surface contours: BMOD



Opera

UNITS

| | |
|-------------------|-------------------|
| Length | mm |
| Magn Flux Density | T |
| Magnetic Field | A/m |
| Magn Scalar Pot | A |
| Current Density | A/mm ² |
| Power | W |
| Force | N |

MODEL DATA

Hall_Test_14.op3
TOSCA Magnetostatic
Nonlinear materials
Simulation No 1 of 1
3220313 elements
5236523 nodes
12 conductors
Nodally interpolated fields
Activated in global coordinates

Field Point Local Coordinates

Local = Global

FIELD EVALUATIONS

| Cartesian | CARTESIAN | 201x140 | Cartesian |
|--------------|-----------|---------|---------------|
| (nodal) | | | |
| x=-8000.0 to | | y=0.0 | z=-20000.0 to |
| 6500.0 | | | 1000.0 |

Overview

Note: Slightly slower week as I've had to spend 2 days with the target at RAL....

The only item added to the model was the floor (needed as a reference structure) – This did cause a few problems that needed resolving but proved to be a useful exercise.

Other minor issues with the existing model needed resolving, geometry details, magnetic material details. (Some incorrect BH curves!)

I've started putting together the documentation that I said I would take responsibility for last week.

I have an interesting result around Q9 but NEEDS MORE CAREFUL STUDY

Documentation

I've generated a couple of spread-sheets

- 1) "Modelling Priority List.xlsx"
- 2) "Model Component List.xlsx"

"Modelling Priority List.xlsx"

The first spreadsheet is a rather simplistic list of jobs that we need to accomplish. I've filled in a few loose details of what we want to do but I want feedback/jobs to add with specific details.

Can you take a look at the spread-sheet get back to me on both content and format?

The order of priority is to be discussed within the group at a future meeting however consideration will need to be given to what components have been modelled within the hall.

Documentation

“Model Component List.xlsx”

The second spreadsheet details what is in the model and what components have yet to be added. I've not included this today as after spending the last couple of days at RAL I've acquired a lot more information (thanks to others) so this sheet needs updating!

This will also provide a history of any changes that are made to individual components in the model.

The eventual idea is that this will tie-in to a third spread-sheet that will give details of what components were in each model that is going to be run. By referencing back to the second spreadsheet it should be possible to ascertain if any geometric/material changes have been made to any components etc.

New Components

Had a much shorter week so the only component I've added to the model is the Hall Floor.

This presented some problems as it clashed with the shield walls, learning how to successfully mesh this was a useful exercise.

I would still like to add the iron in the cellar and the EMR before we look at the West Wall and is now that I have information on the cellar this is at the top of my list.

New Components

Craig, Luke (and in part myself) spent some time looking around the MICE hall to ascertain what certain components were on the 'iron to be added' list as there was some ambiguity as to location and amount of steel with some of the components, eg...

- Iron buried in the cellar
- Transformer Wall
- North Mezzanine
- Linac Shield Wall
- Items behind North Shield Wall
- Quad Stands
- West Wall Stairs
- Steel plates over the trench

This was a very useful exercise but these items need to be prioritised in terms of when they go into the model. Had much discussion with Mike on Tuesday about this and various other issues.

I am acutely aware that we need a working model asap even if some of the smaller/trickier items are left off for now...

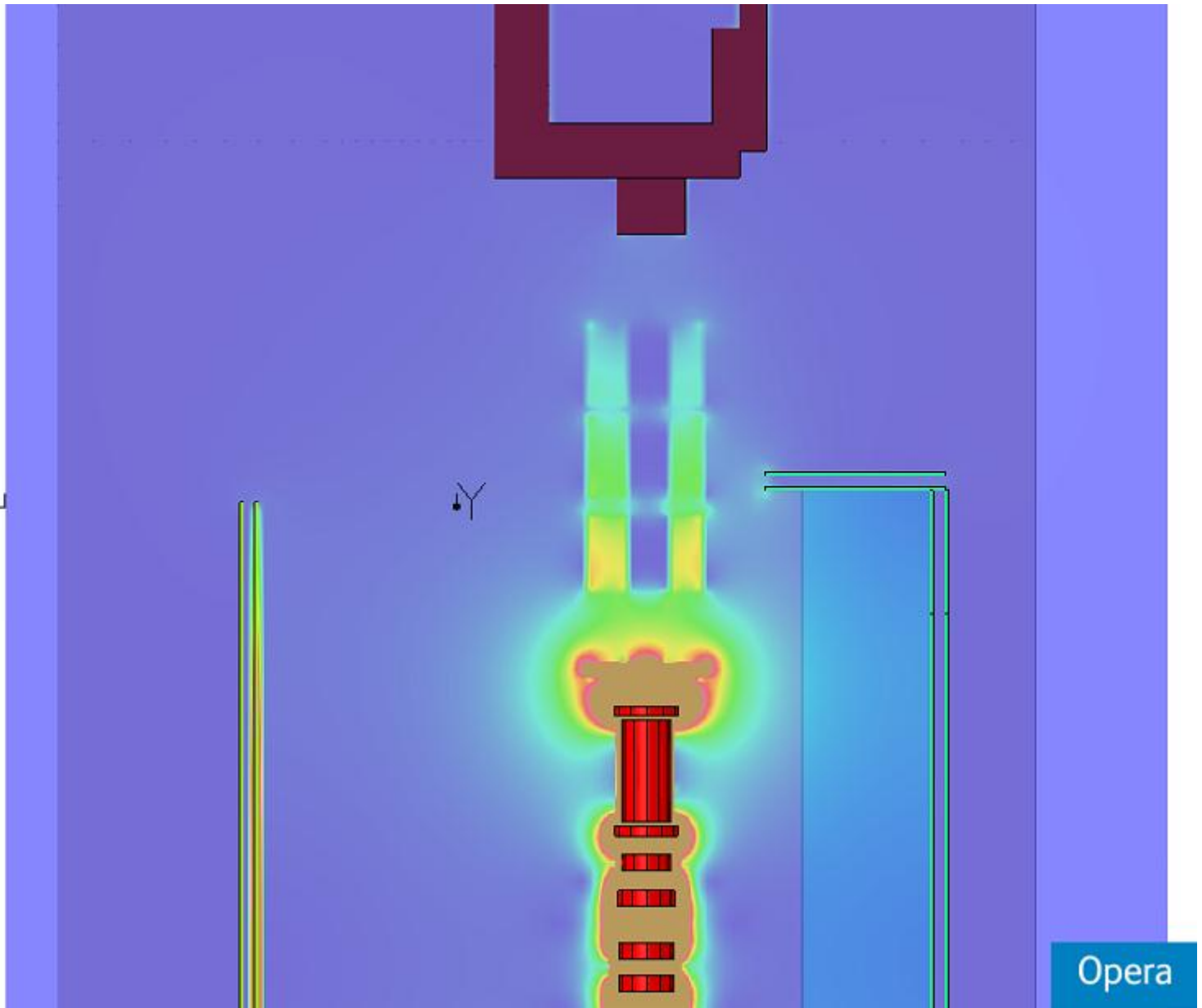
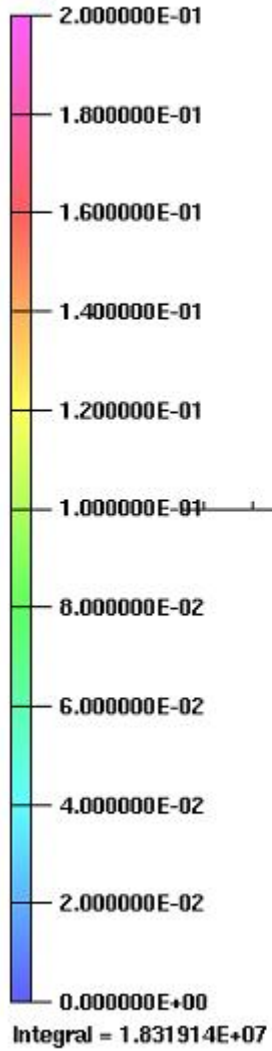
Interesting Result – Q9

Before showing this next slide there are a few caveats

- Q9 (and Q4 – Q8) are modelled as solid lumps of iron. This is almost certainly inaccurate as it doesn't account for volume taken up by the windings.
- After our hall survey with Craig and Luke on Monday it is clear that there is a LOT of additional steel underneath Quads Q9-Q7 that needs accounting for in the model. This additional steel will undoubtedly skew the results.
- However I think these plots highlights that the area around Q9 will need further consideration, even if this requires a separate higher resolution model.

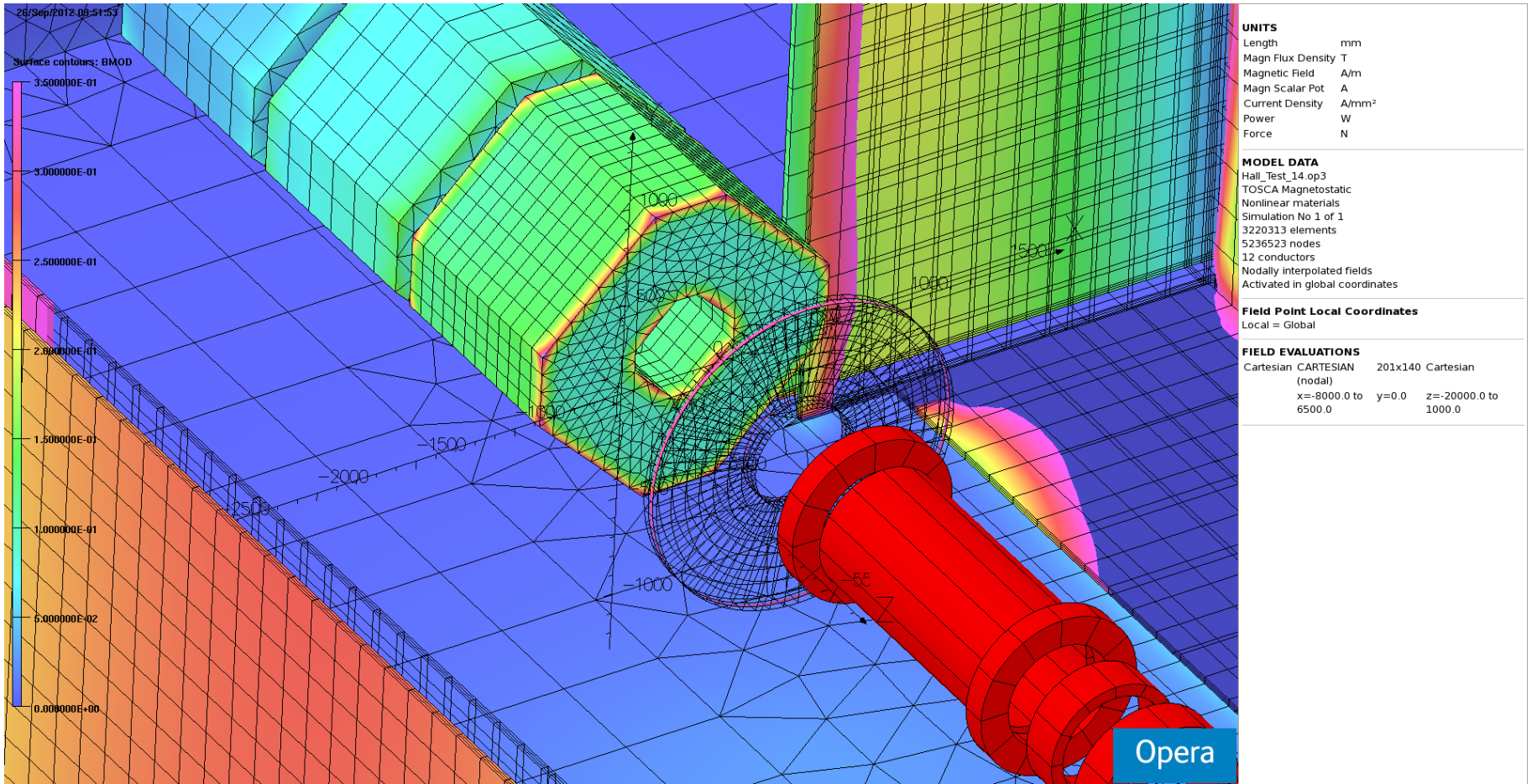
25/Sep/2012 13:58:28

Map contours: BMOD



Opera

Q9 plan view of B field at Beam Axis – Preliminary plot –
Known model simplifications exist!



Q9 Surface View – Preliminary plot –
 Known model simplifications exist!