SoLID

# Radiation and Activation with SoLID

## Outline




Lorenzo Zana
*The University of Edinburgh*

September 11, 2015

# Director's Review: Suggestions

## Areas of further investigation

- Baffle material optimization
- More detailed study on radiation on magnet's coil
- More detailed on impact of radiation in the Hall with focus on areas where electronics will be present
- Complete the set of possible configurations

# Director's Review: Suggestions

## Areas of further investigation

- Baffle material optimization
- More detailed study on radiation on magnet's coil
- More detailed on impact of radiation in the Hall with focus on areas where electronics will be present
- Complete the set of possible configurations

## Further development already planned and not in previous suggestions

- Further testing with He3 target and simulation outputs
- More detailed mapping of radiation inside the magnet
- Implementation of latest PVDIS baffles into FLUKA
- Improve and design new shielding for servicing SoLID during run time

# Director's Review: Suggestions

## Areas of further investigation

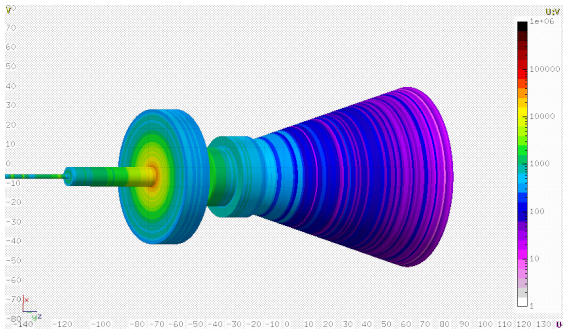
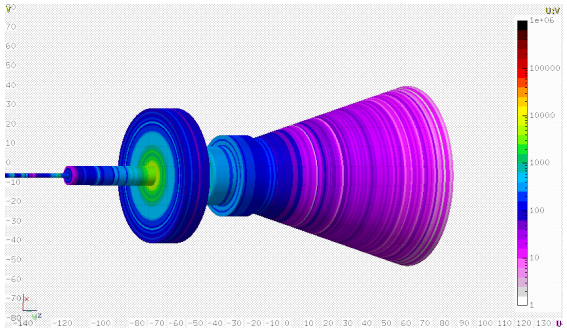
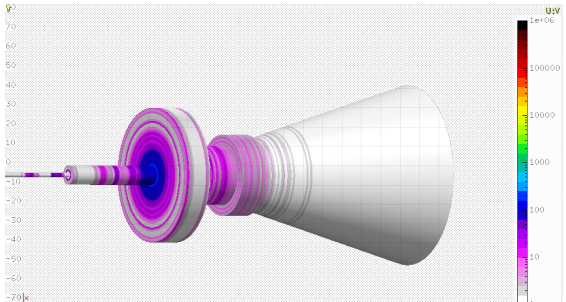
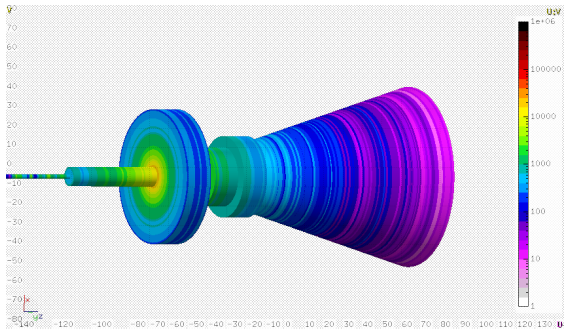
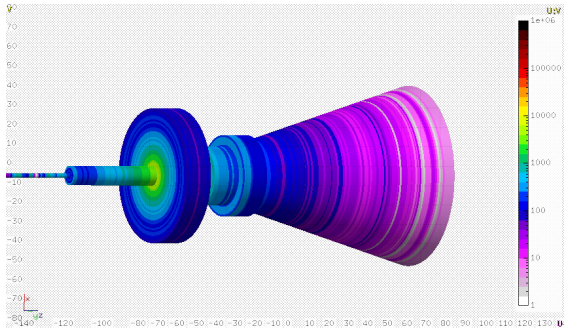
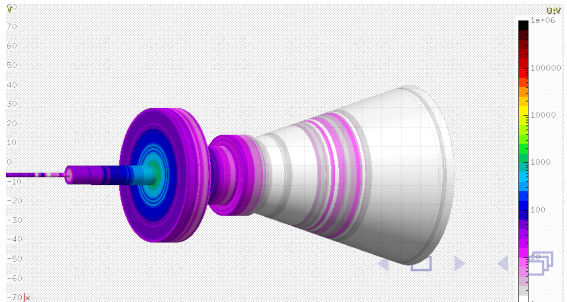
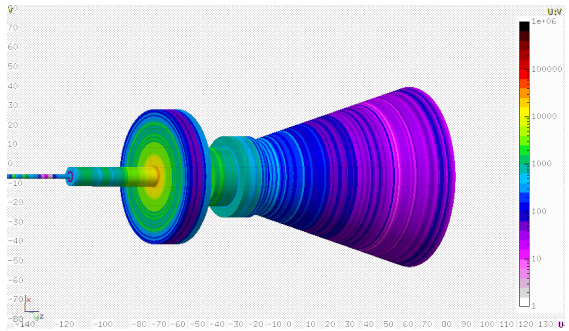
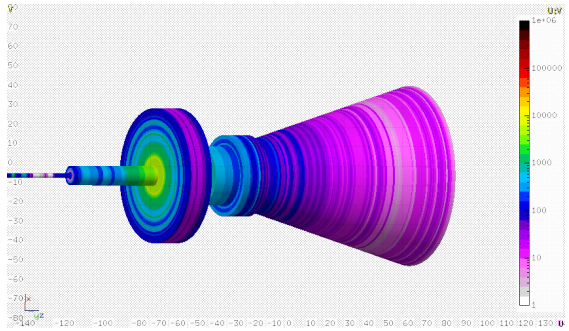
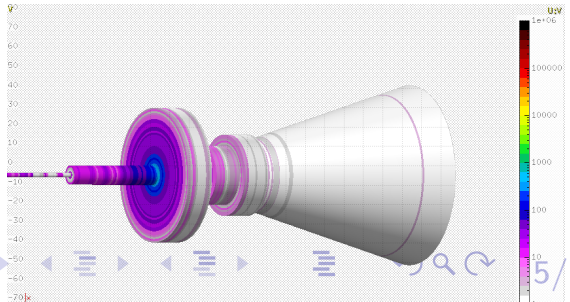
- Baffle material optimization (activation study: See last meeting)
- More detailed study on radiation on magnet's coil
- More detailed on impact of radiation in the Hall with focus on areas where electronics will be present
- Complete the set of possible configurations

# Baffle Activation (see last collaboration meeting for more details)

LEAD

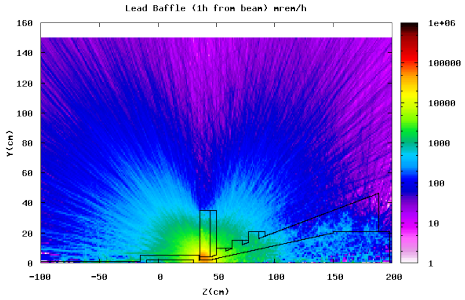
COPPER

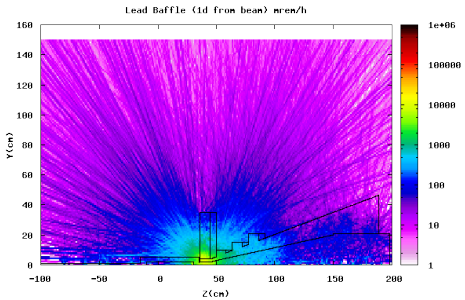
TUNGSTEN

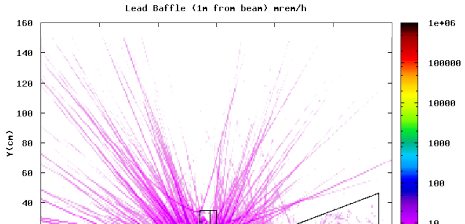










# Baffle Activation (see last collaboration meeting for more details)

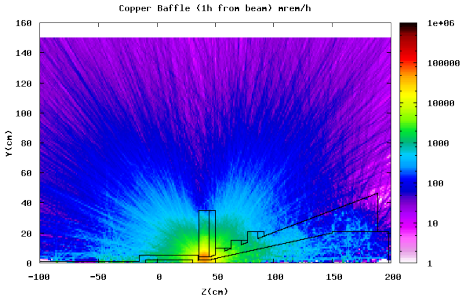
## LEAD

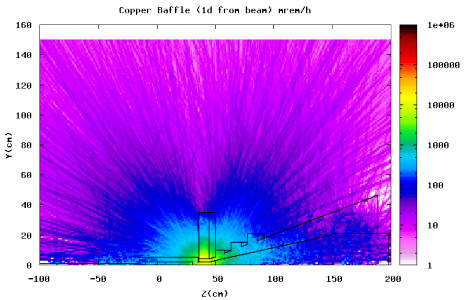


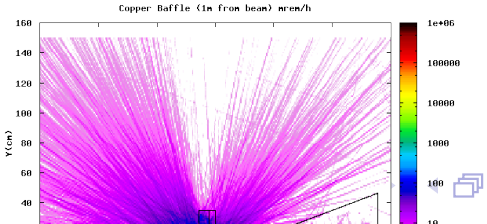



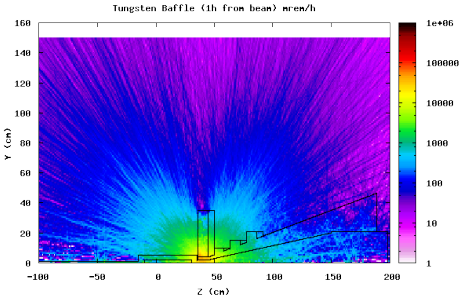

## COPPER

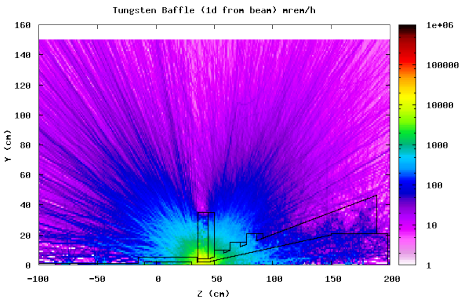


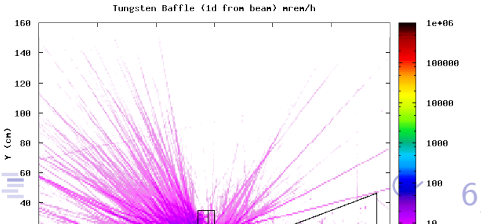




## TUNGSTEN



# FLUKA

## Advantages in FLUKA

- Shielding studies and Radiation estimates
- optimize computing power (bias , low energy neutron algoritms, etc..)
- Only program that can calculate Activations (experimentally validated at Jlab)
- (From comminication with radcon) "electronuclear interaction mechanism in the main FLUKA distribution version, but it has been added in the new development version (I have been testing it for several months now), which is going to be released by the end of this year"

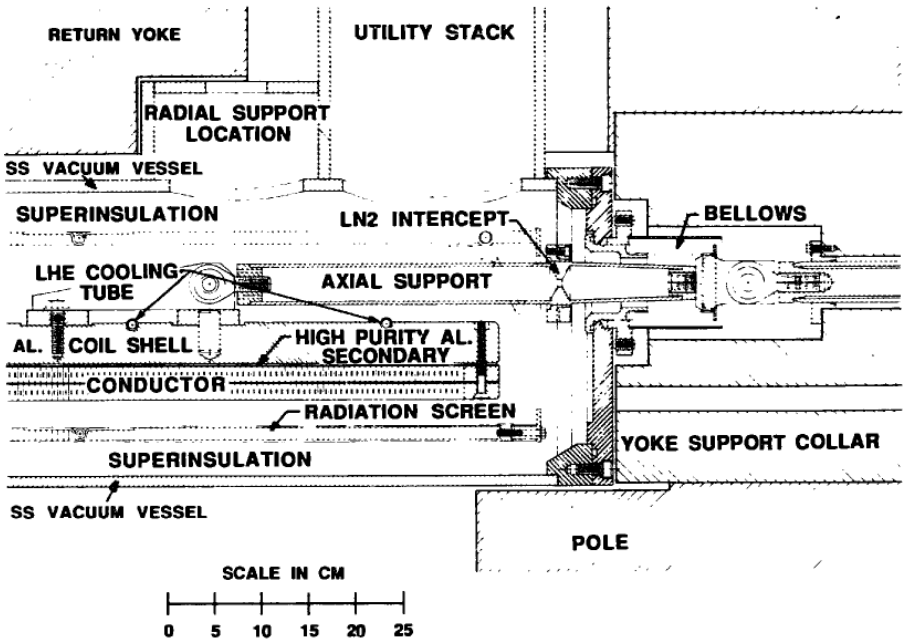
# FLUKA

## Disadvantages in FLUKA

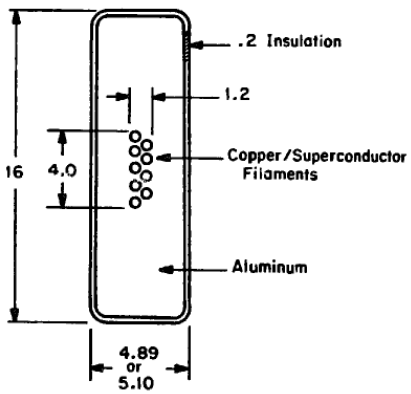
- Geometry is more complex than GEANT4 (limits in boolean operations, number of intersections)
- Baffles cannot be translated as they are (the design optimizes the number of boolean operations)
- Fortran based (implementations like source inputs, magnetic field are done in external subroutines).
- Output complex to manipulate

# Coil Activation

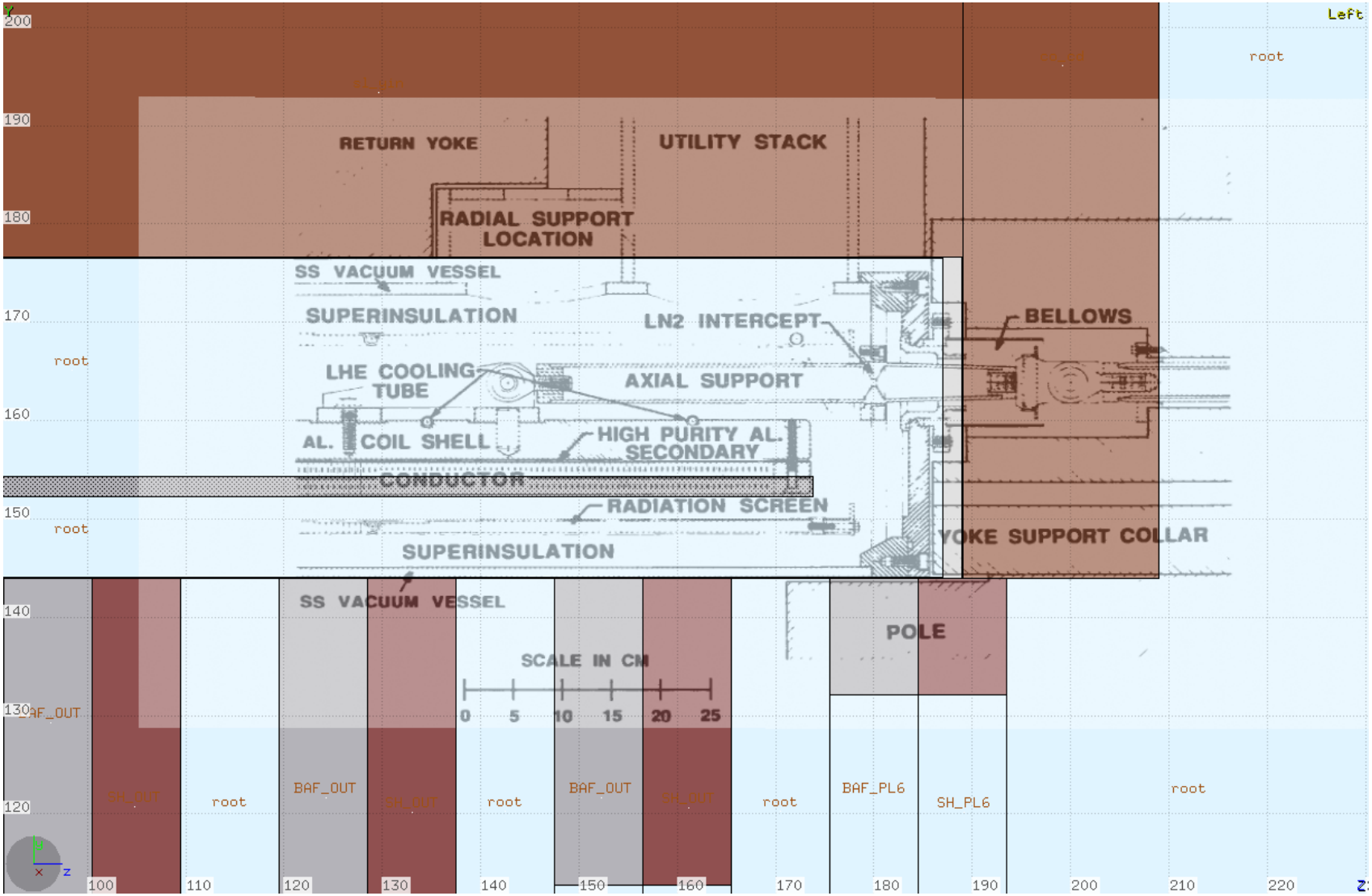
## MAGNET



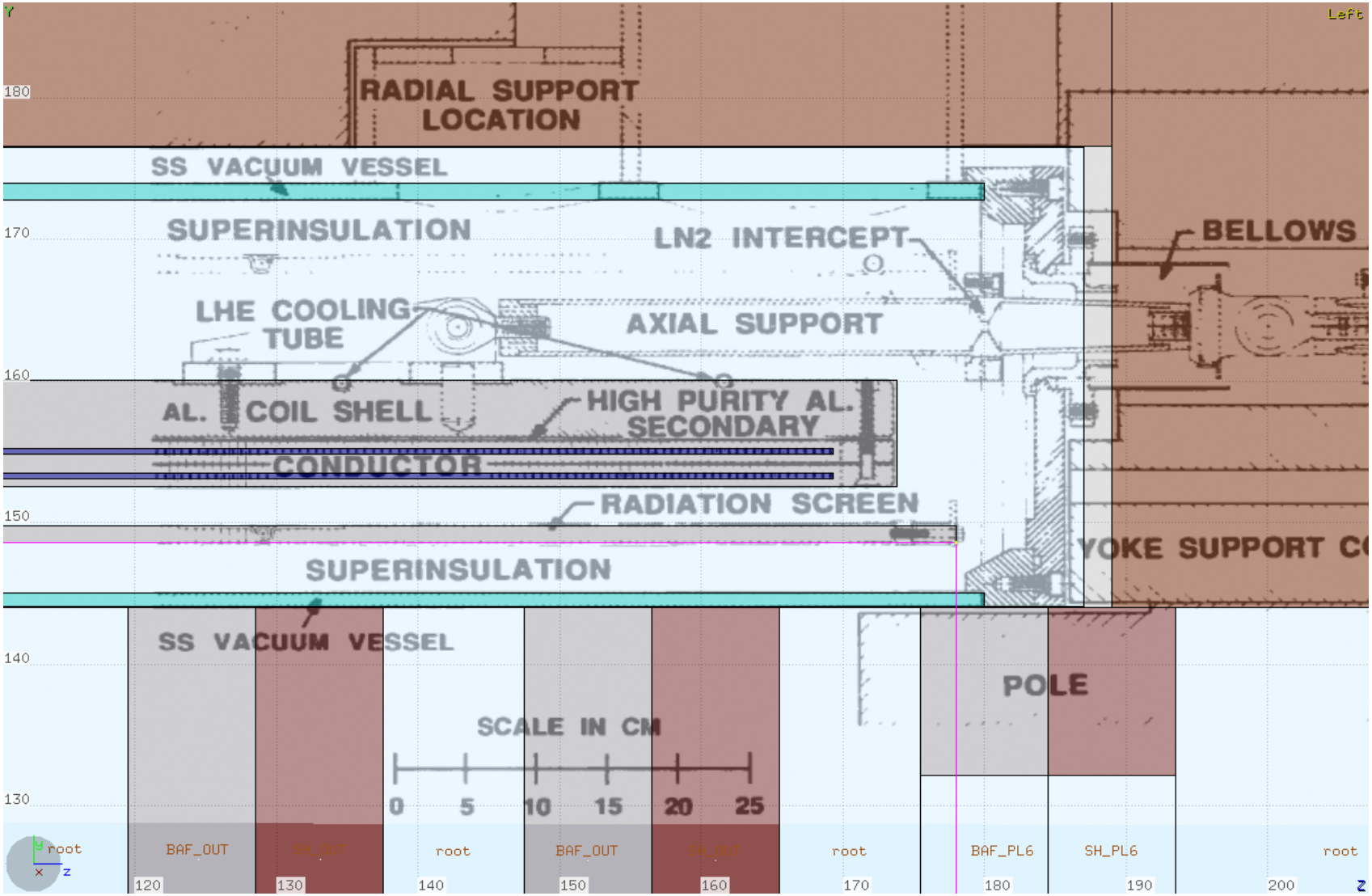

## COIL



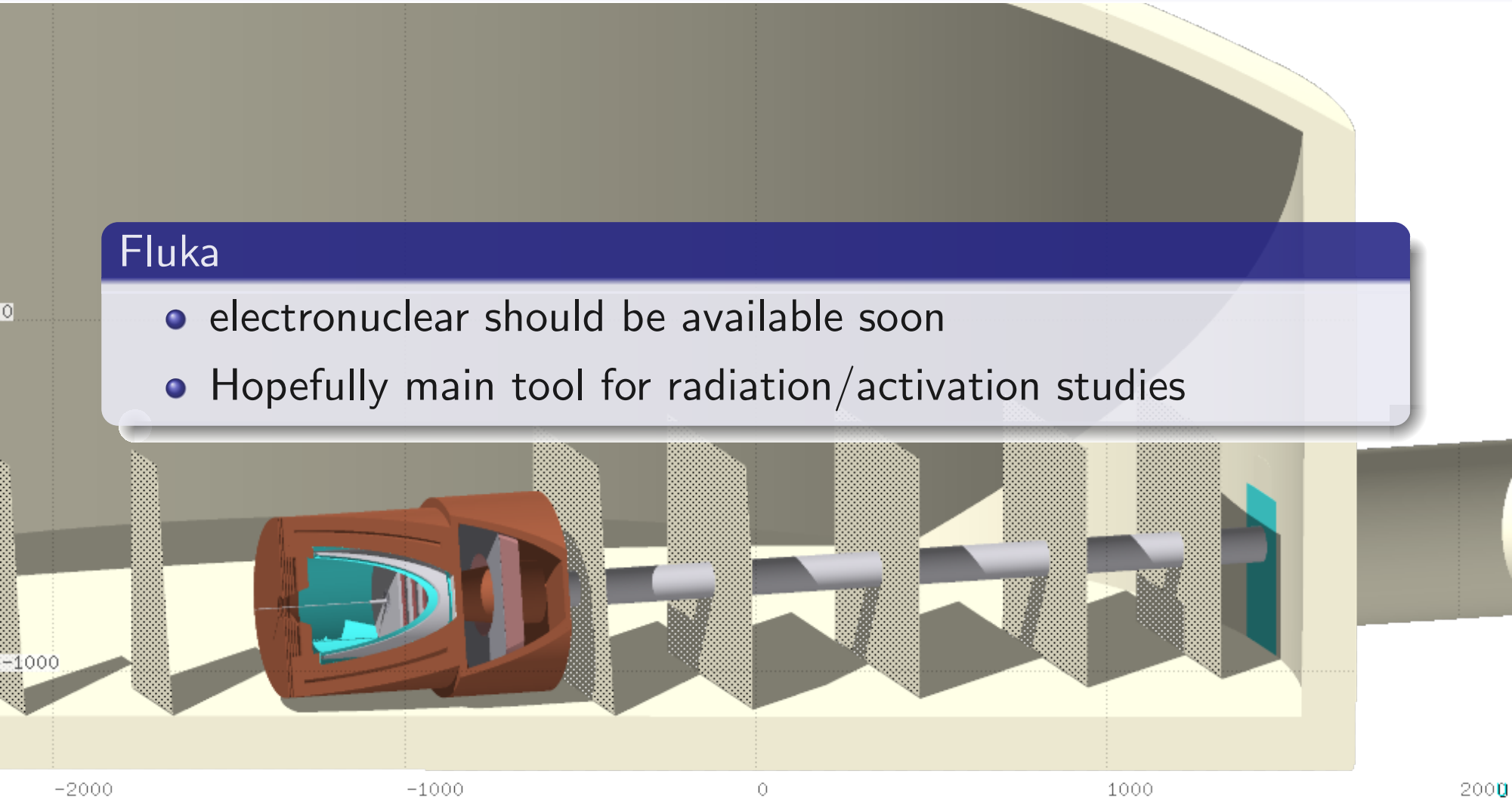
# Coil Activation: Status before



# Coil Activation: At now



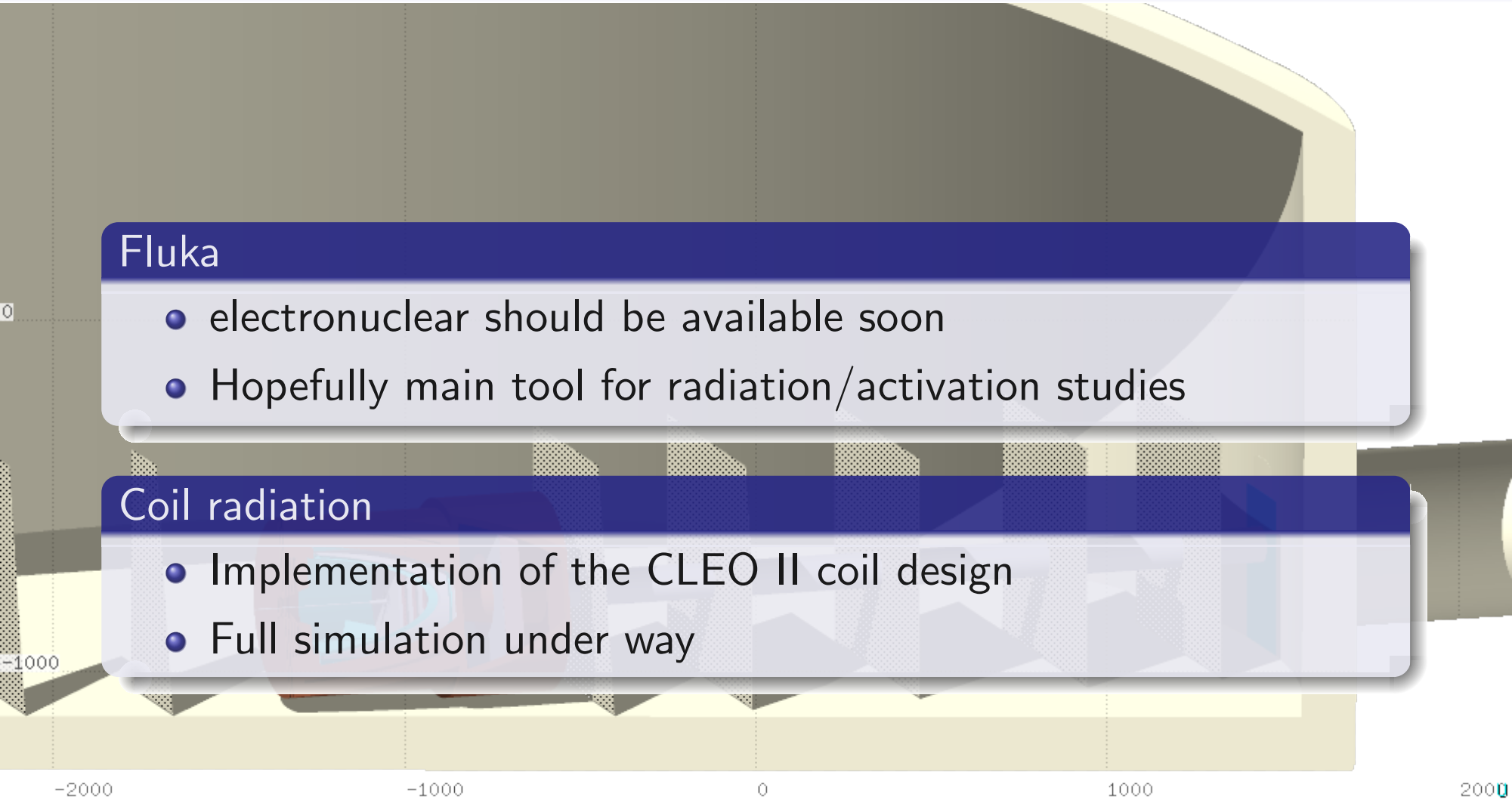
# Conclusions




## Fluka

- electronuclear should be available soon
- Hopefully main tool for radiation/activation studies

# Conclusions




## Fluka

- electronuclear should be available soon
- Hopefully main tool for radiation/activation studies

## Coil radiation

- Implementation of the CLEO II coil design
- Full simulation under way