

Overview of the Current Status of IFMIF-DONES Test Cell Biological Shielding Design

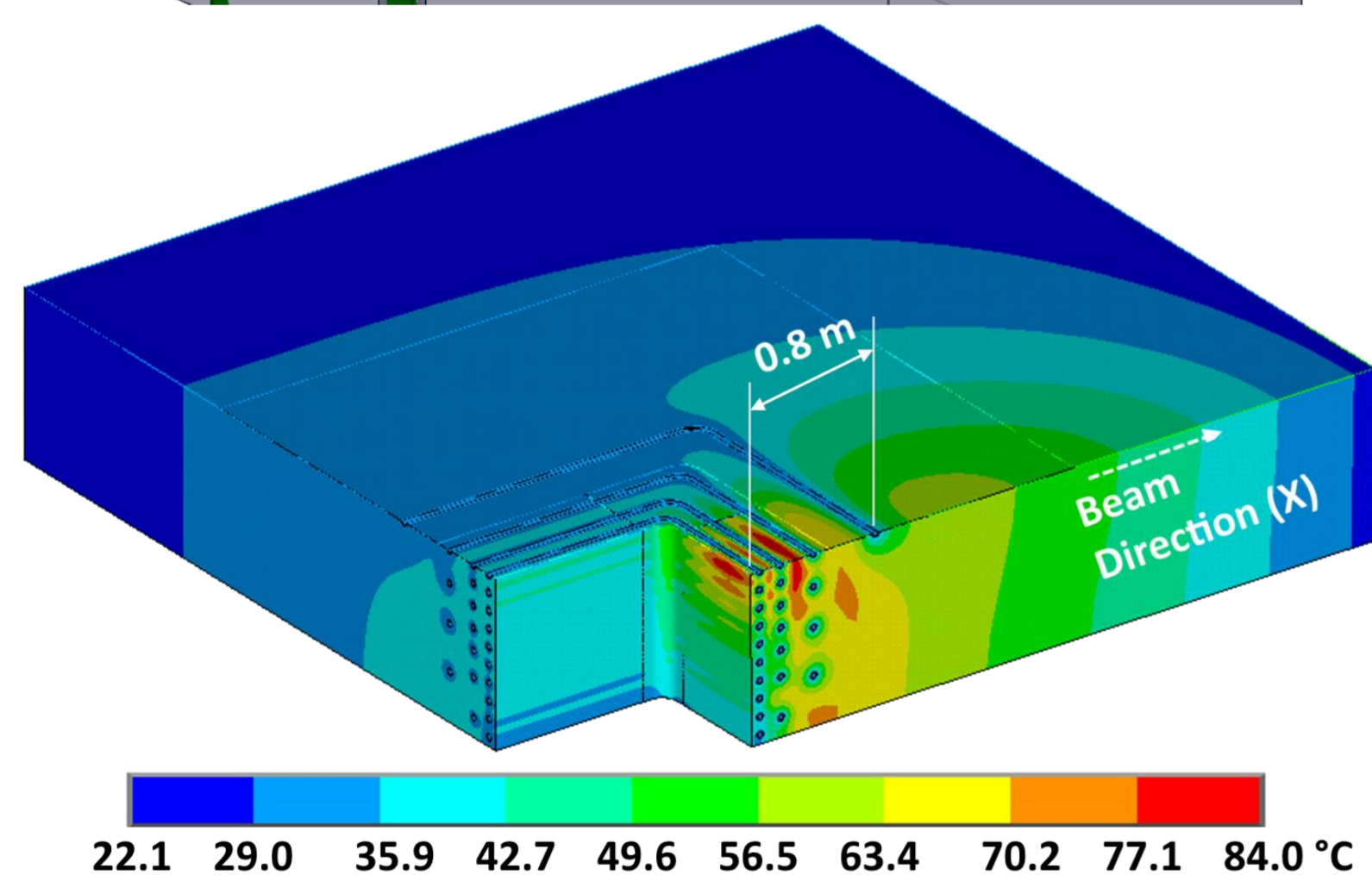
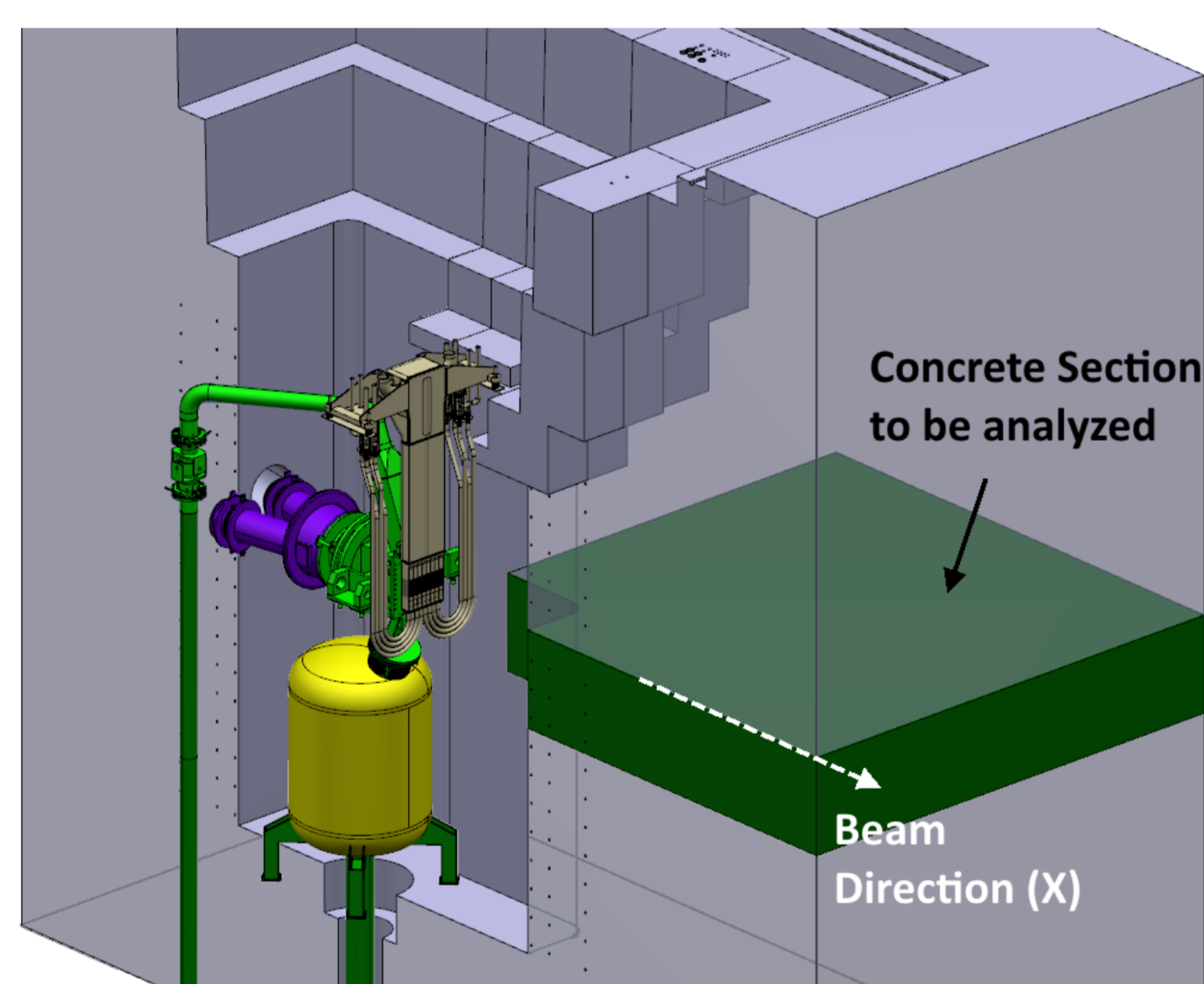
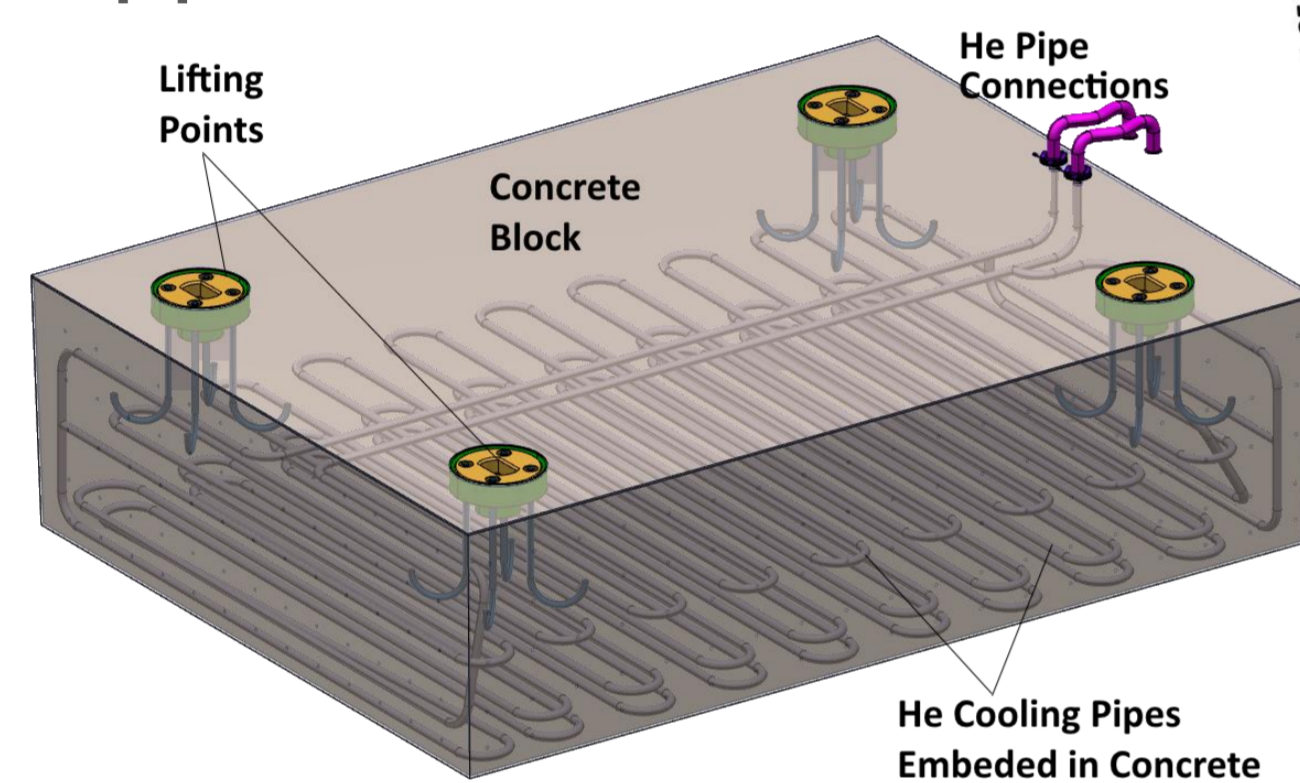
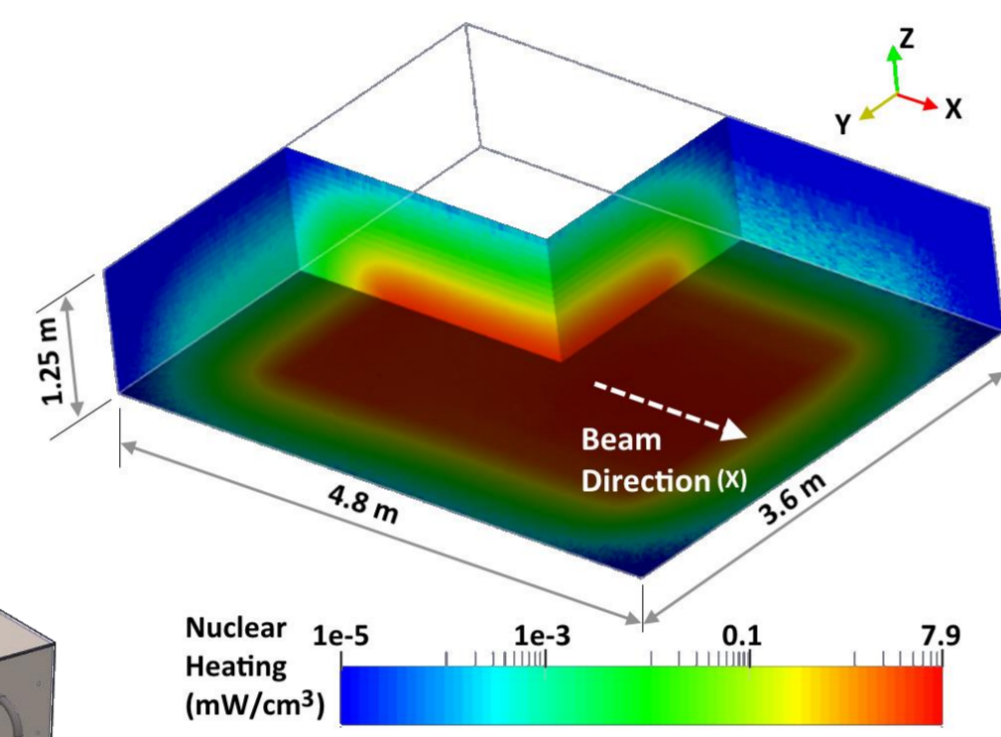
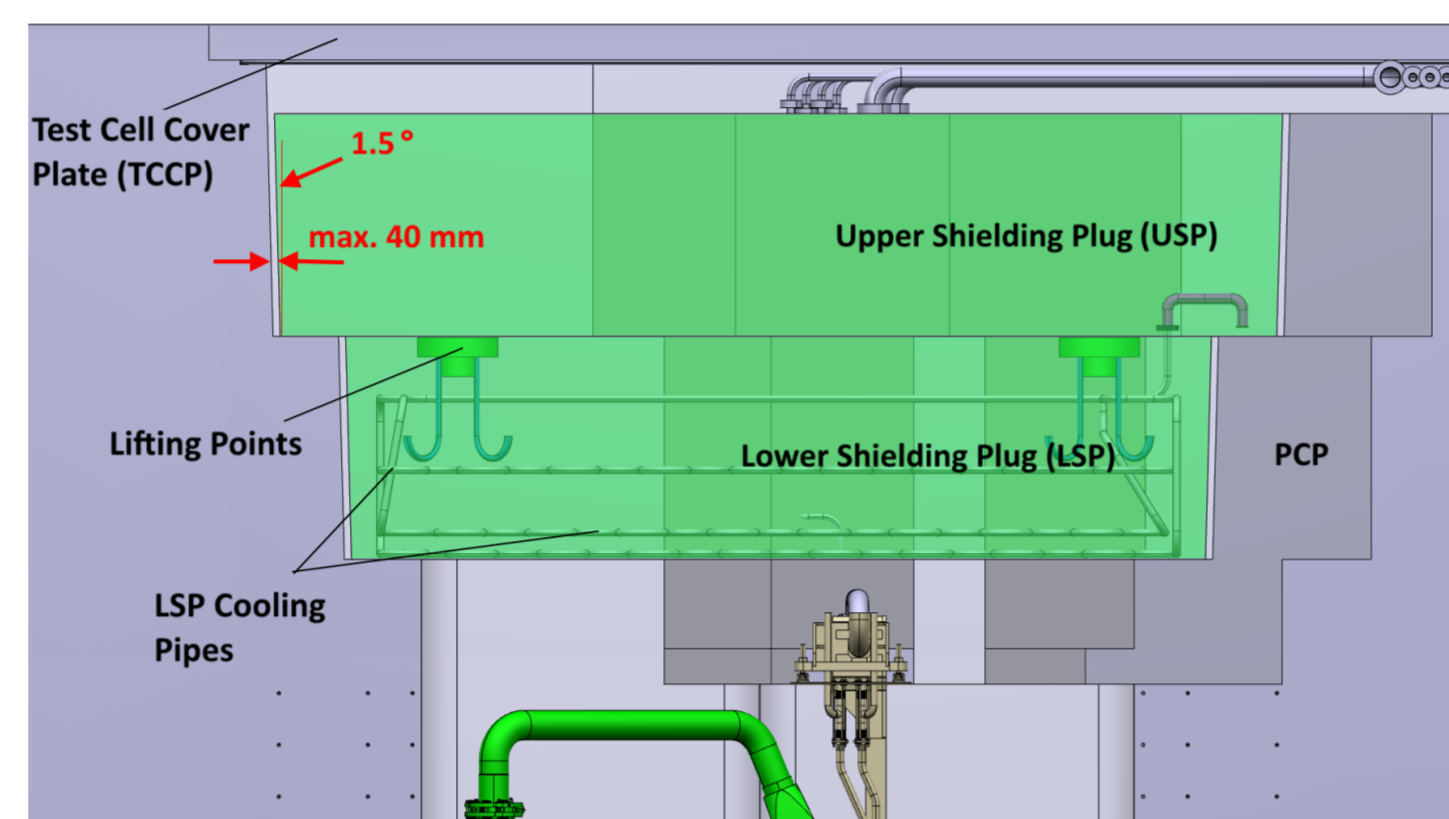
Kuo Tian^{a*}, Begoña Ahedo^b, Frederik Arbeiter^a, German Barrera^b, Łukasz Ciupiński^c, Tamás Dézsi^d, Jonathan Horne^e, Dániel Kovács^d, Joaquin Molla^b, Fernando Mota^b, Yuefeng Qiu^a, Florian Schwab^a, Marcin Siwek^c, Mátyás Tóth^f, Tamás Varga^g, Angel Ibarra^b

^aKIT, Germany, ^bCIEMAT, Spain, ^cWarsaw University of Technology, Poland, ^dWigner RCP / C3D Ltd., Hungary

^eRACE, Culham Science Centre, United Kingdom, ^fHAS, Wigner RCP, Hungary, ^gWigner RCP / Fuziotech Ltd., Hungary

Top Shielding Plugs (TSPs)

- TSPs including USP & LSP
- Geometry adapted for RH
- LSP actively cooled by helium due to high nuclear heating
- Reinforcement and Cooling pipes arranged in LSP
- Cooling capacity being approved

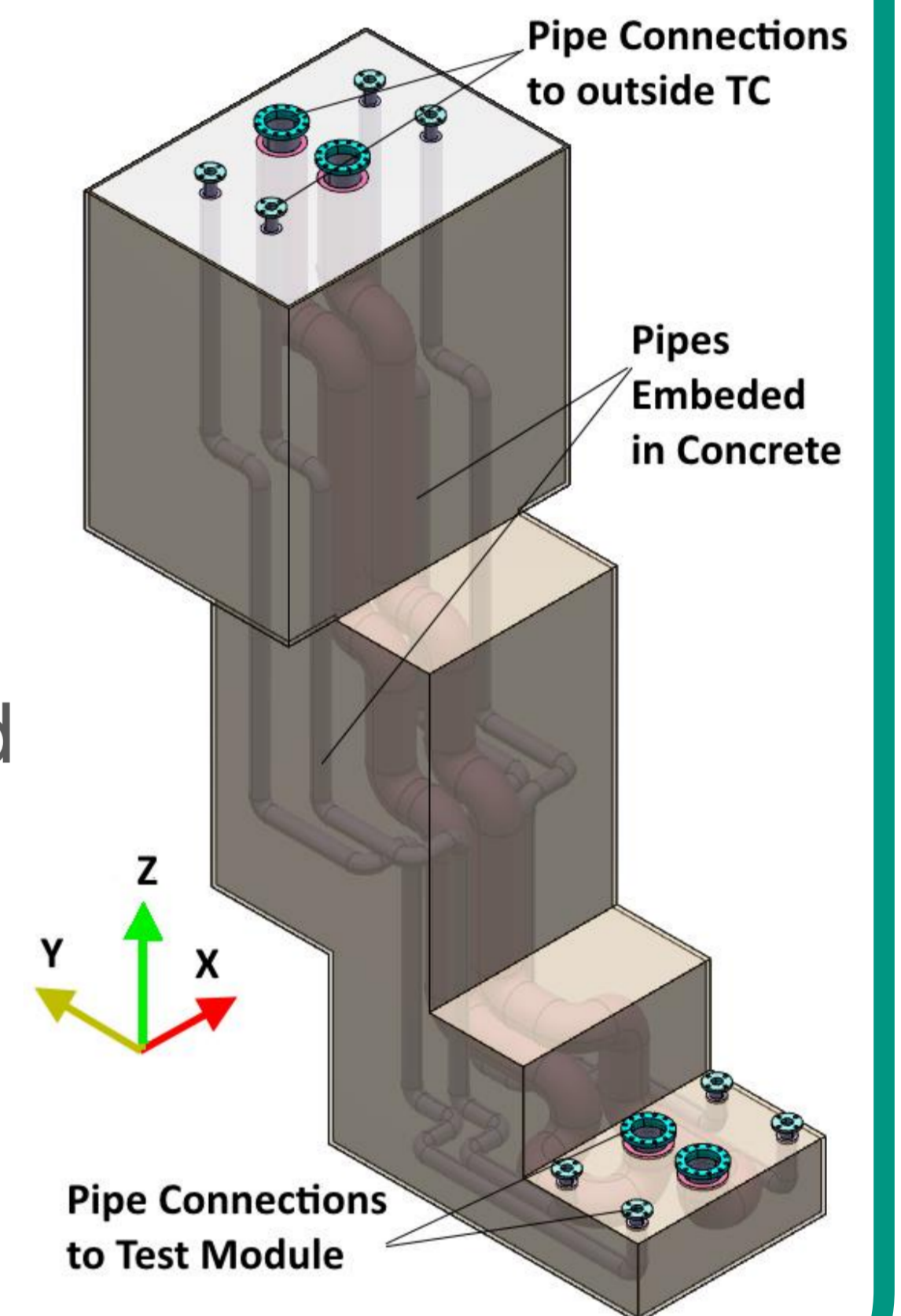


Pipe Arrangement and Temperature Map During Irradiation Experiments

- Surrounding shielding walls updated according to requirement of RH and water cooling systems
- Arrangement of water cooling pipes inside surrounding shielding walls defined
- Cooling capacity is approved based on simulations of a small controlled volume
- Further analysis on 1/4 TC will be implemented

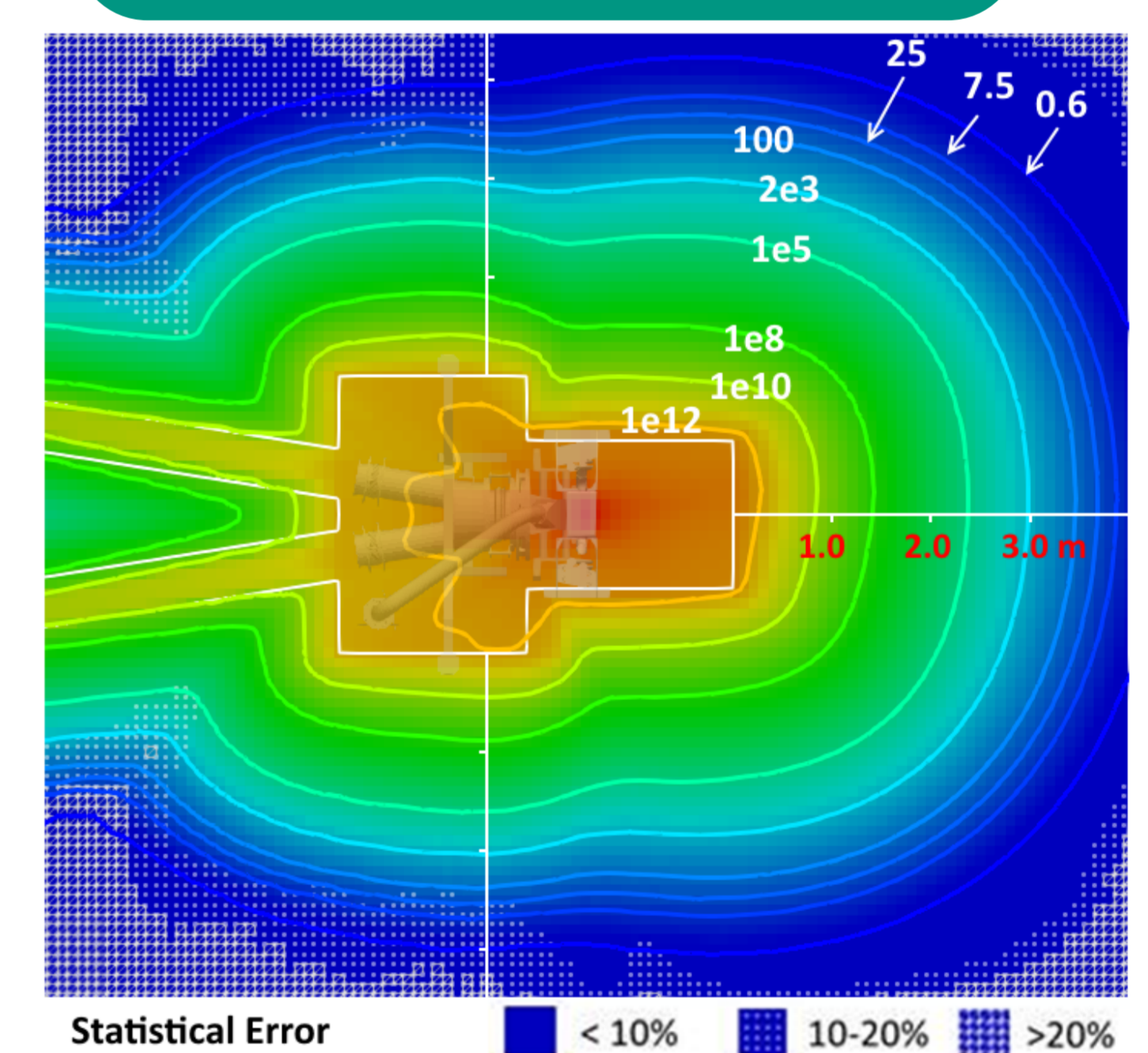
Piping and Cabling Plugs (PCPs)

- PCPs accommodates all pipe/cable penetrations
- PCP design based on IFMIF-EVEDA design
- Lower end of PCP is extended for convenient connection arrangement
- Embedded pipes have several bends to minimize neutron streaming
- Insulation materials applied to helium pipes
- Additional active cooling not required
- Further update on geometry required



- Detailed internal structure to be completed

Surrounding Walls



Dose ($\mu\text{Sv/h}$) map in the TC surrounding wall

SUMMARY

- Design of DONES-TC biological shielding components updated
- TC surrounding shielding walls: geometry updated, active cooling pipes preliminarily arranged
- PCPs: geometry updated, piping and cabling defined
- Lower Shielding Plug: detailed structure and calculations implemented

*Corresponding author: kuo.tian@kit.edu