Plasma source status

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Report on WDL meeting

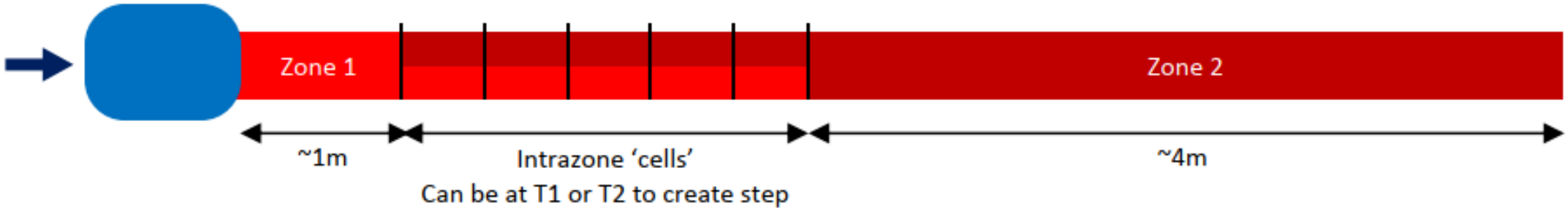
- Three main points
  1. Heating system to obtain density step (see Lotov's presentation from CM)
  2. Requested parameters for viewports (density measurement and shadowgraphy)
  3. Laser beam-dump

Following slides were taken from WDL

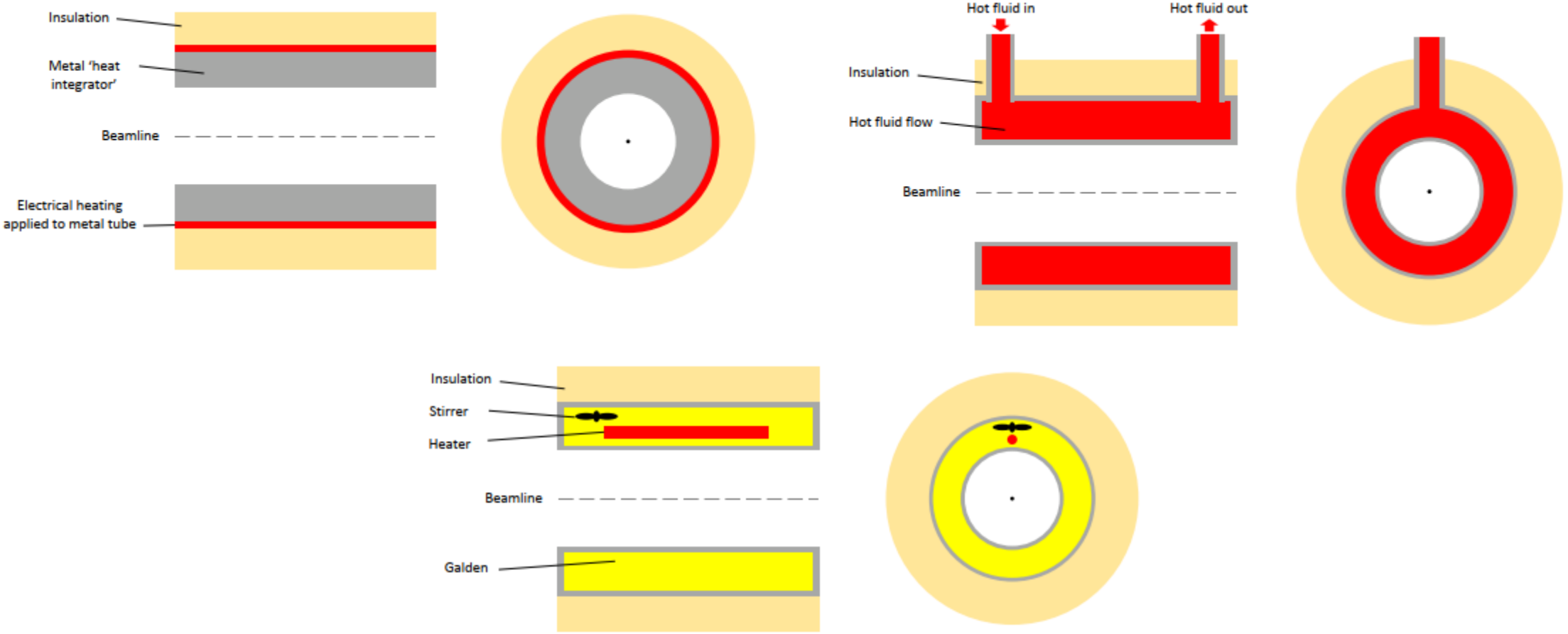
1. Heating system

The proposed next generation AWAKE experiment requires that a temperature (density) step can be created at multiple locations on the beamline. This creates a three-region system:

1. Zone 1 – fixed at T_1
2. Zone 2 – fixed at T_2 (> T_1)
3. A set of intrazone 'cells' that may be at T_1 or T_2 depending on the step location



1.1 Intrazone cells

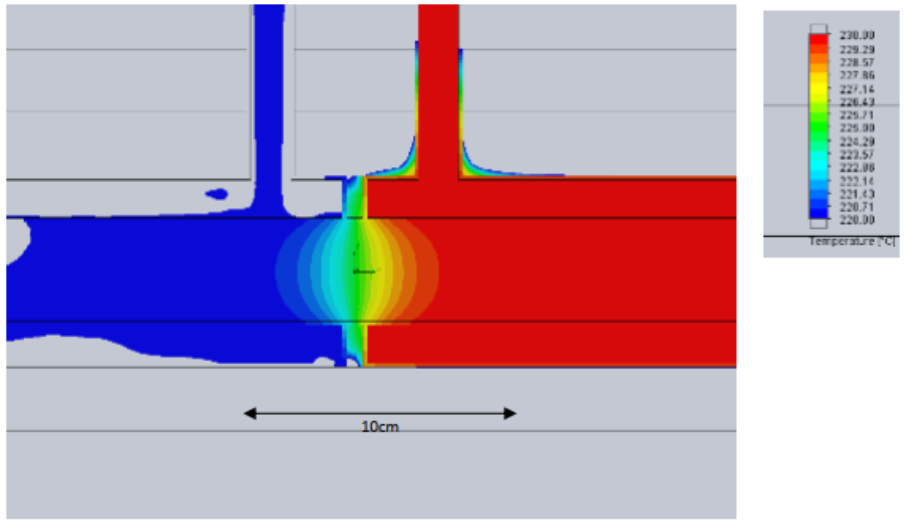


1.1 Intrazone cells - requirements

- Length around 50 cm
- Sharpest temperature for 0 - 10% density step
- Without step the temperature should be as uniform as possible

Figure 9 – Thermal simulation CAD model – Pumped Galden

The following shows the temperature of the inside surface of the vacuum tube.



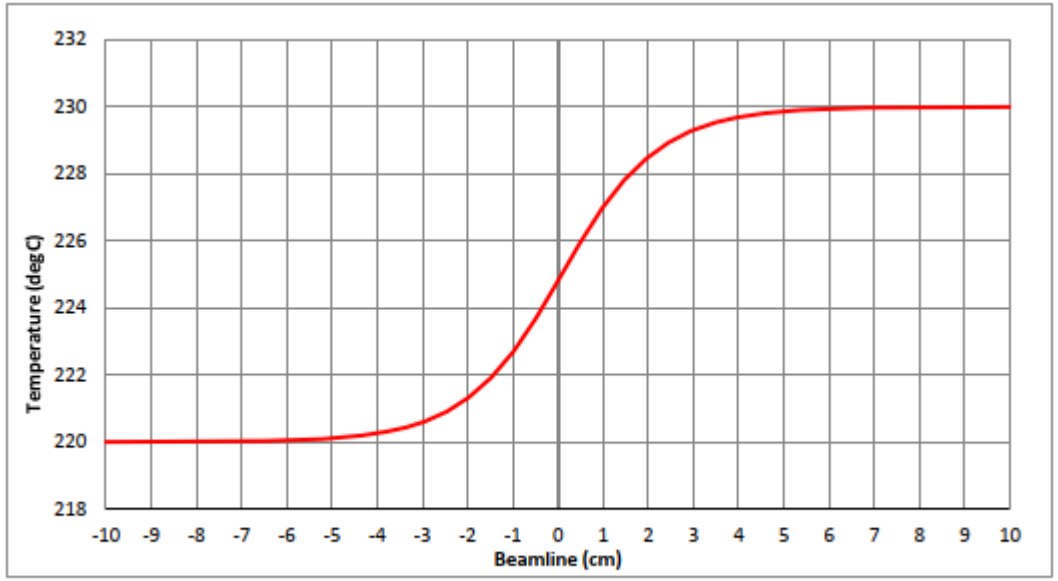


Figure 11 – Thermal simulation results – beamline temperature profile

1. Heating system - overall

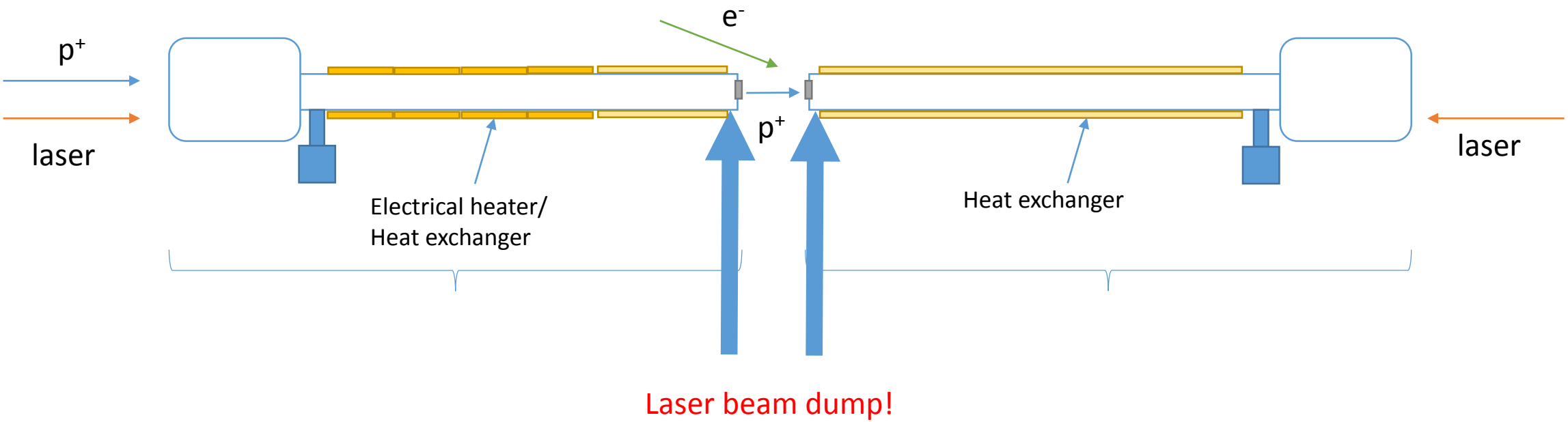
- Zone 2 will be most likely made out of Galden again
- More simulations will be done for determining the best option for intrazone cells
  - Consider density step position sensitivity

2. Viewports

- How many are needed? (2? Or 2 per heating zone)
- The sapphire windows seem to be inappropriate for THz radiation
  - (will there be 2 types of viewports?)
- Thermal effect of the windows?
- Safety

3. Laser beam-dump

- Has to be in the vapor source! (with hot Rb)



Plan

- Choose between Galden and electrical heating
- Create a prototype with 4 heating zones (test temperature step)
- Next WDL meeting will take place at CERN at the end of October

Thank you for your attention