



TS/CV/DC CFD Team

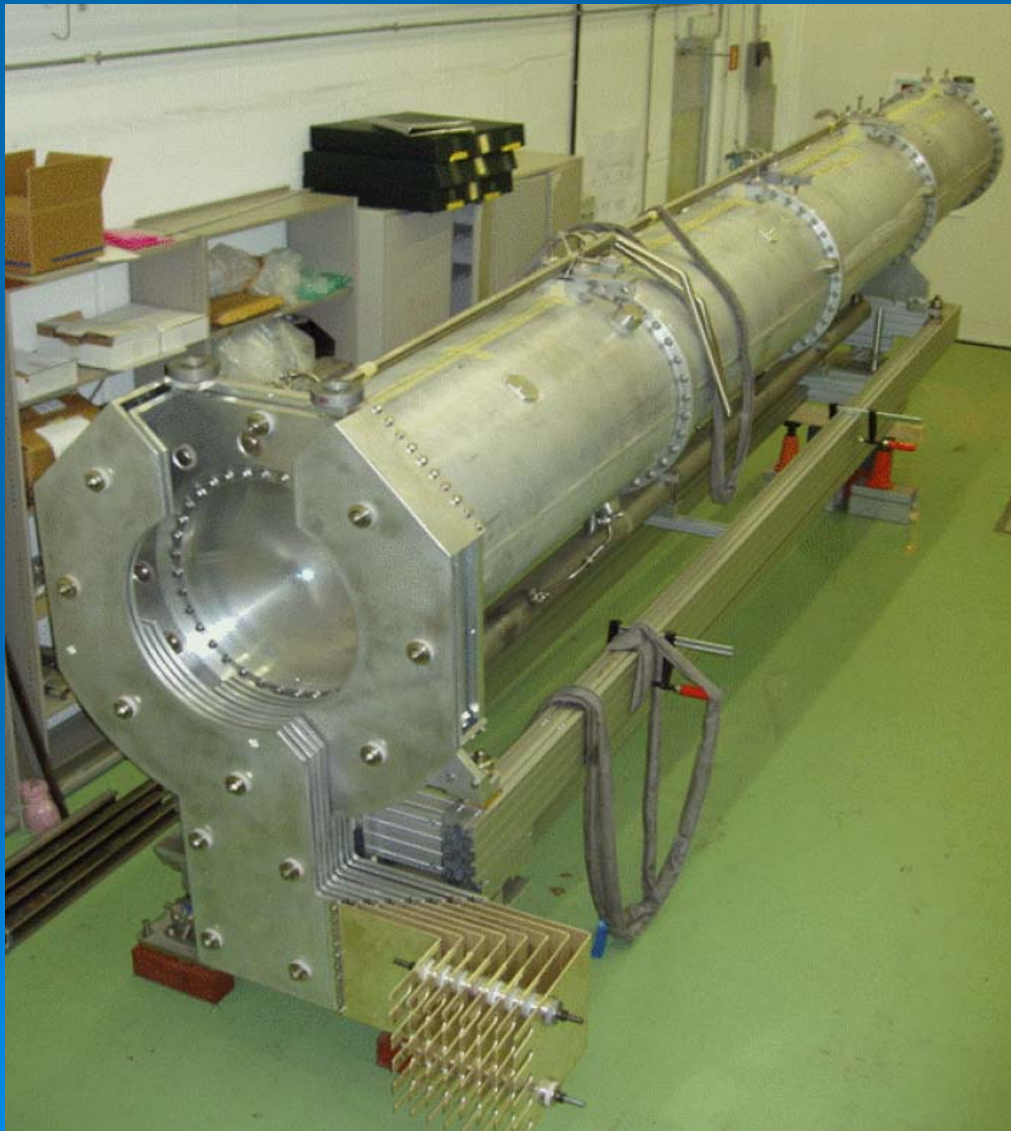


Ventilation efficiency for Horn cooling

Moritz Kuhn

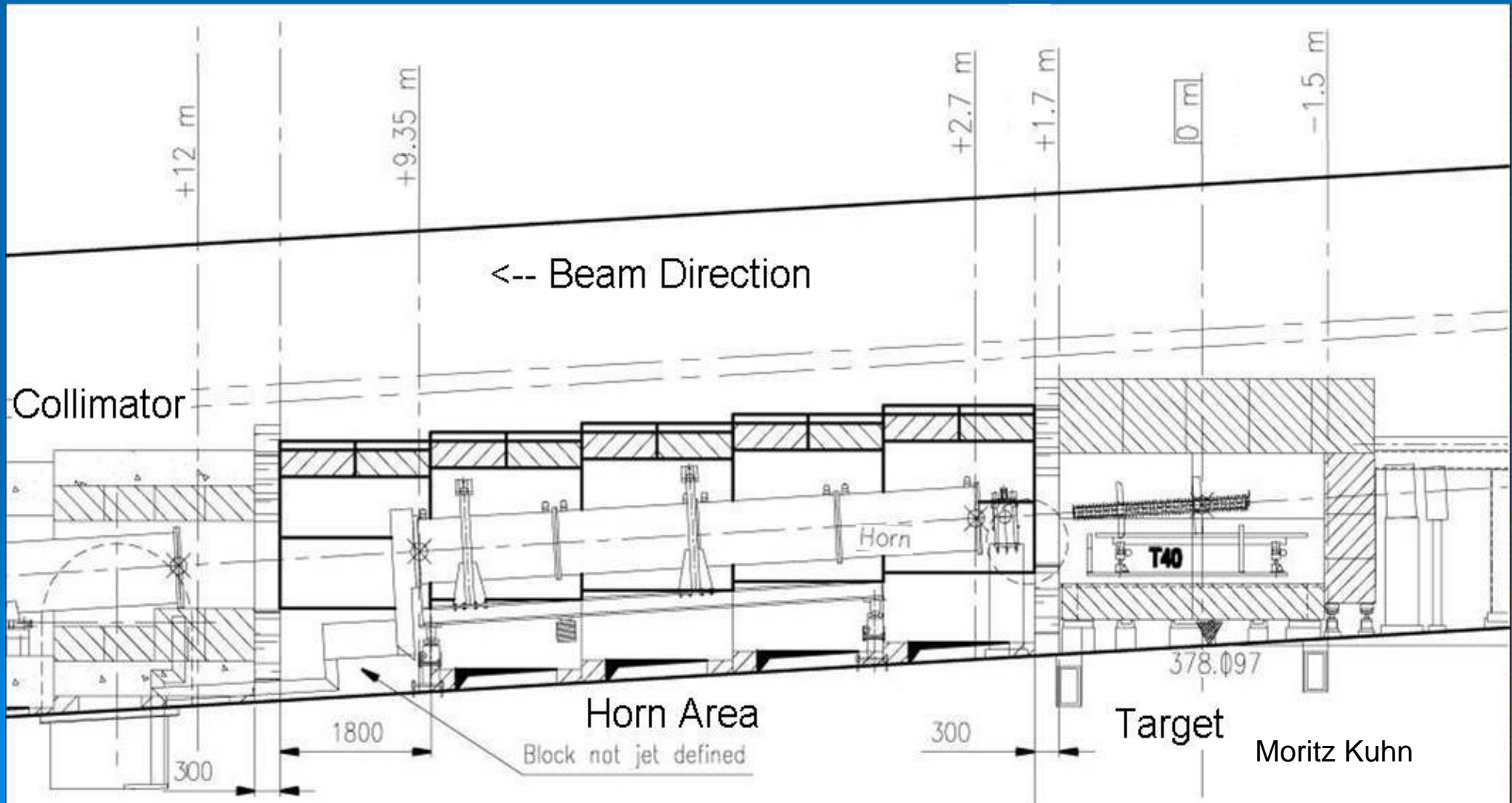
THE HORN

The Horn System is dedicated to focus the particles, which are produced in the target, in to the beam to Gran Sasso.



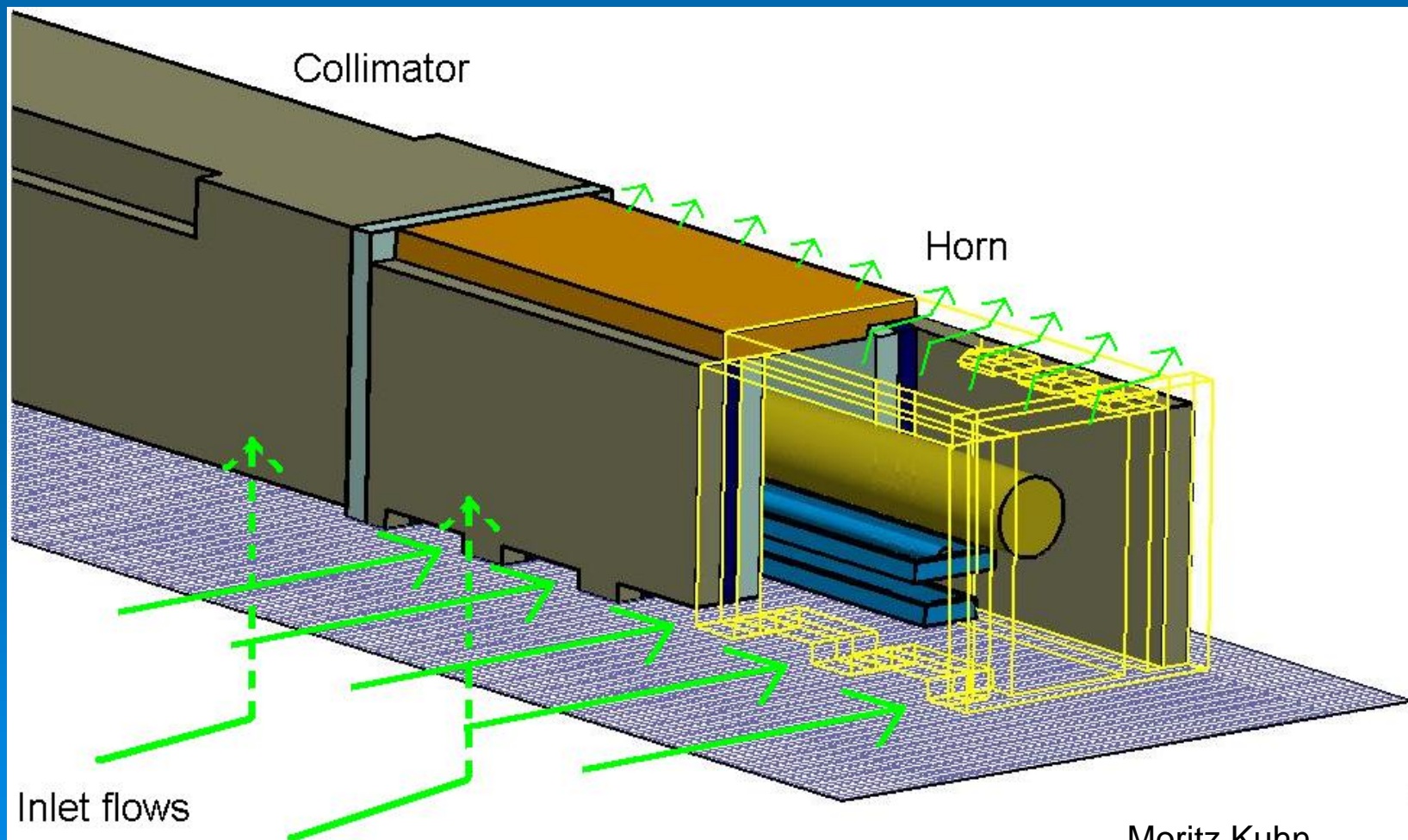
THE PROBLEM

Through the particle energy deposition, we have a heat up on the structure of the Horn System and its Shielding.



The Model - Geometry

- Neglect of the stairs between the single parts of the Horn Shielding, mathematical correction of the gravity
- Combination of the single parts of the Horn Shielding to only one body.
- Only the air is modelled



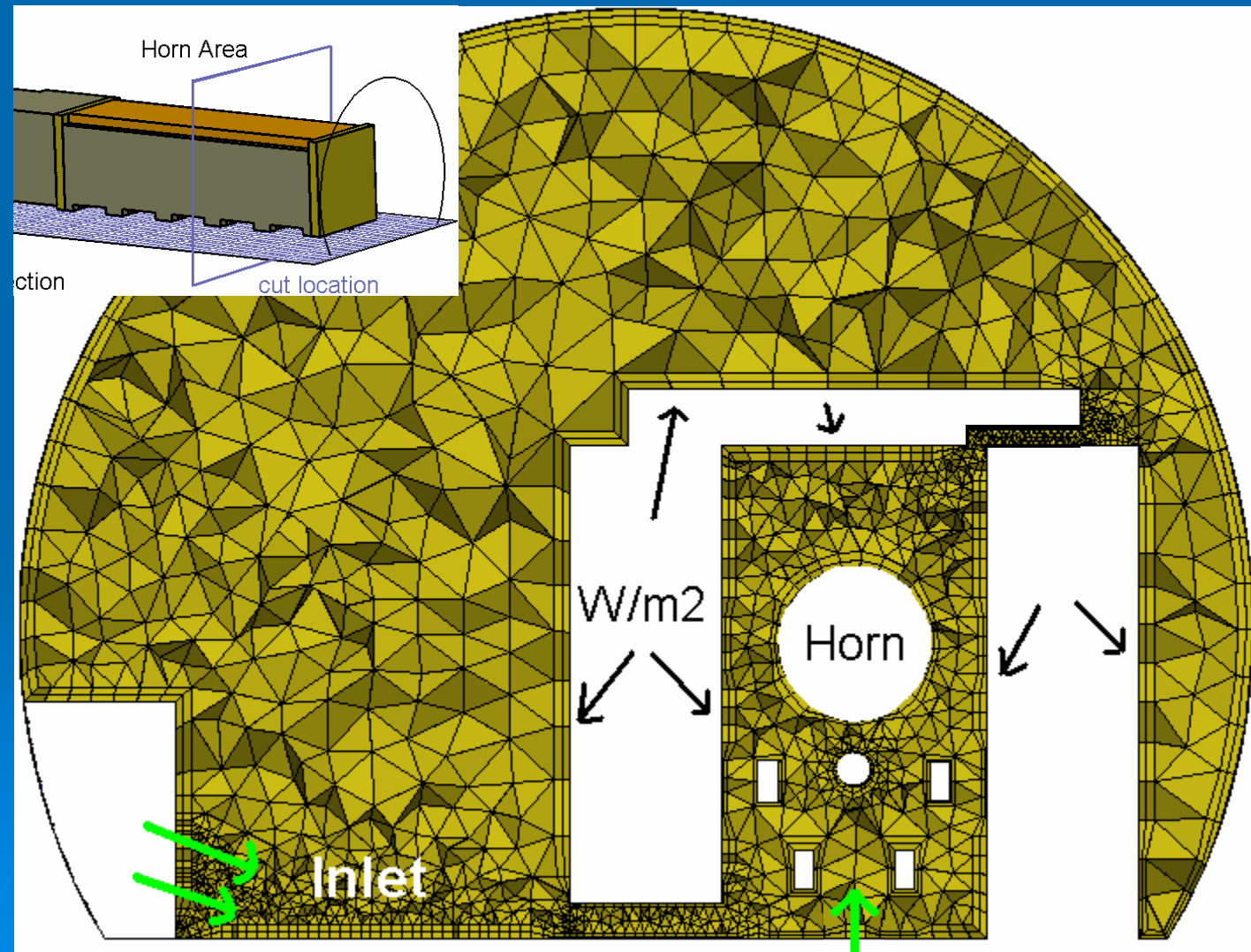
CFD Model: Negative of the real case, with a finer mesh under the Horn Shielding.

Mesh:

- About 1 million cells (Tetrahedral mesh type)

Boundary Conditions:

- Heat Source on the wall of the Horn Shielding (53 kW) and on the Aluminium Frame (250 W)
- Airflow Inlet: 11600 m³/h
- Assumption of adiabatic walls for the cavern

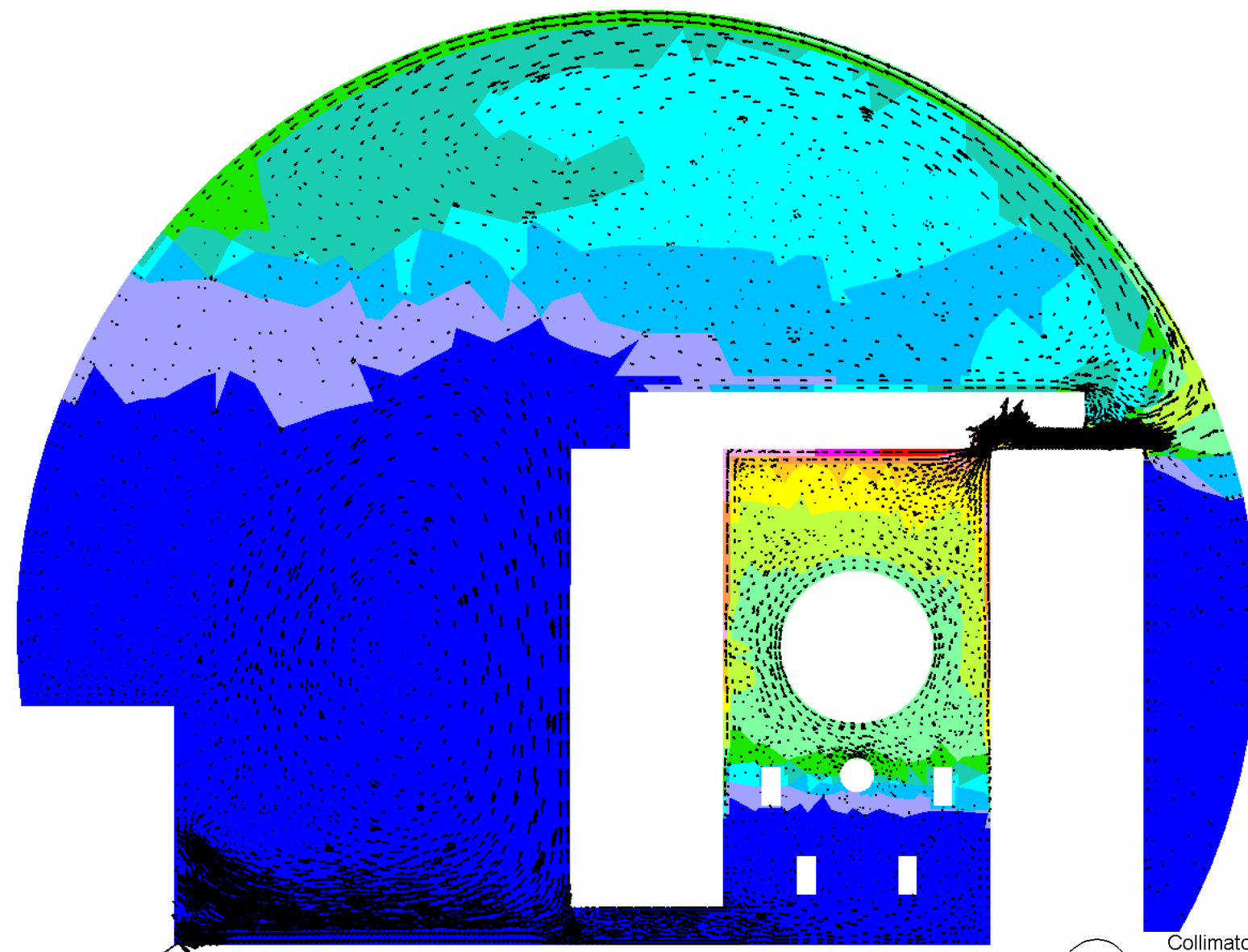
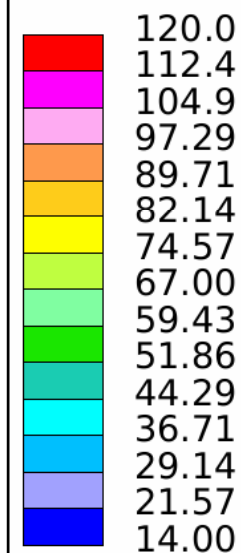




pro-STAR 3.2

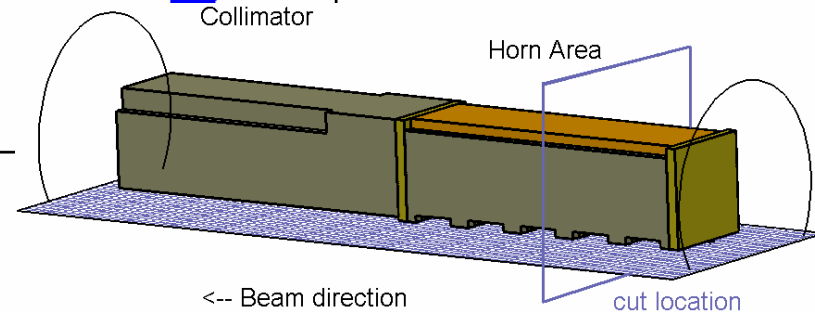
11-APR-05
TEMPERATURE
REL TO TREF
(KELVIN)
TIME = 190.050

Moritz Kuhn



Collimator

Horn Area



<-- Beam direction

cut location

CNGS Horn Area
CFD Cooling and Ventilation Simulation
version with gaps in the roof and add. trenches