



## Ventilation efficiency for Horn cooling

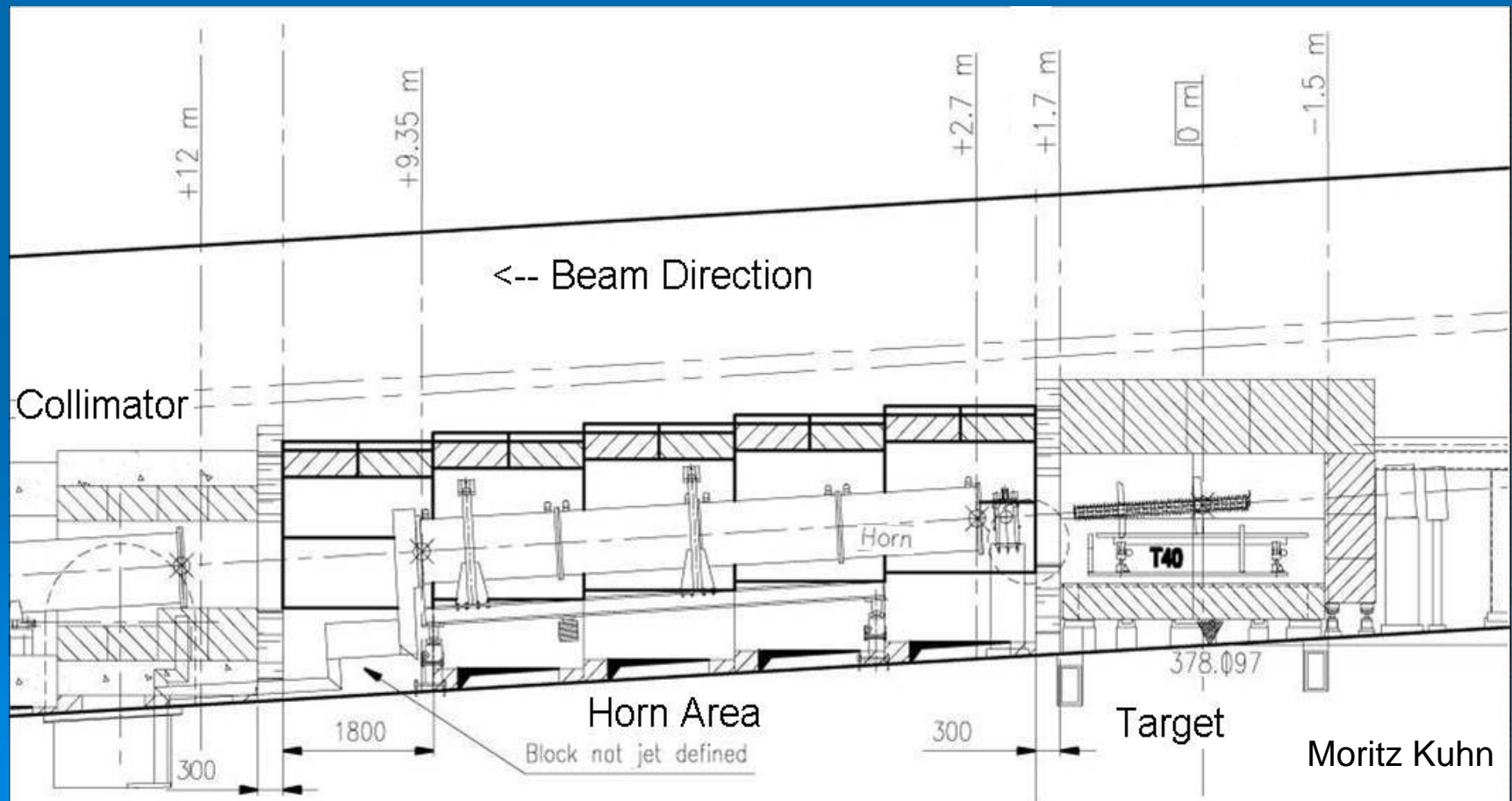


# THE PROBLEM

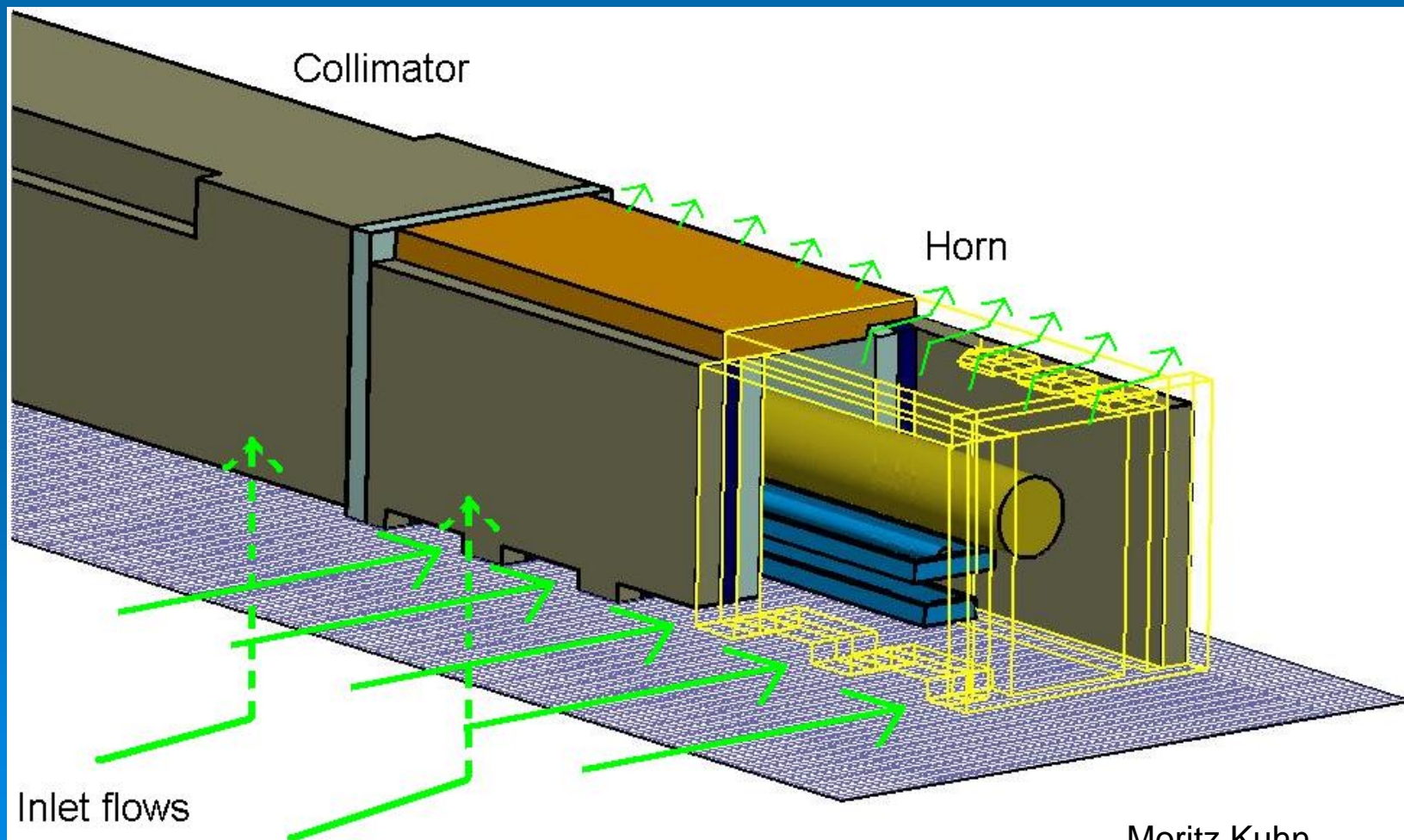


The CNGS Project consists in producing a neutrino beam at CERN and sending it toward the Grand Sasso Laboratory in Italy. The Horn System itself is dedicated to focus the particles, which are produced in the target, in to a beam.

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



- 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



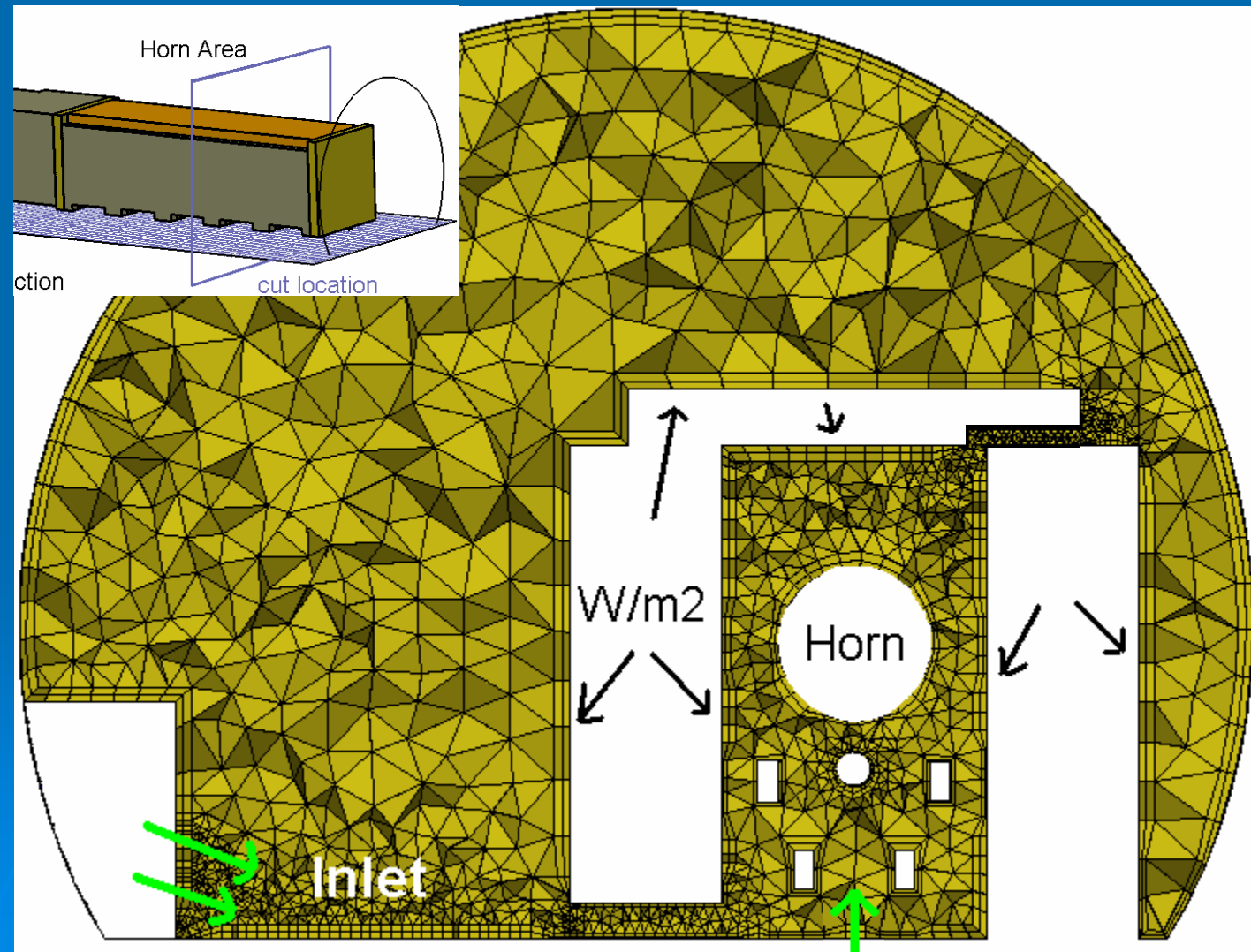
CFD Model: Negative of the real case, with a finer mesh under the Horn Shielding.

## 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 m<sup>3</sup>/h
- Assumption of adiabatic walls for the cavern



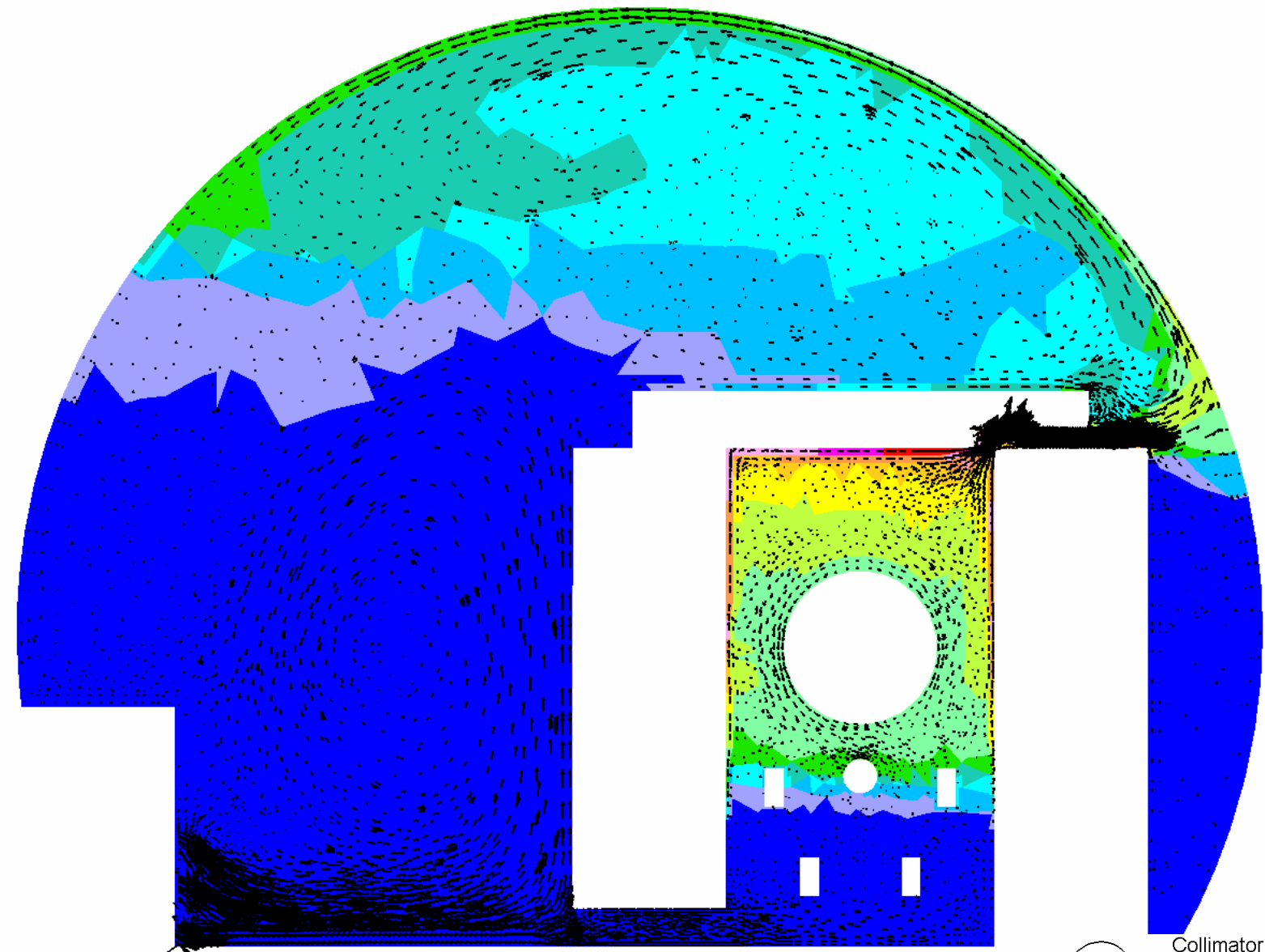
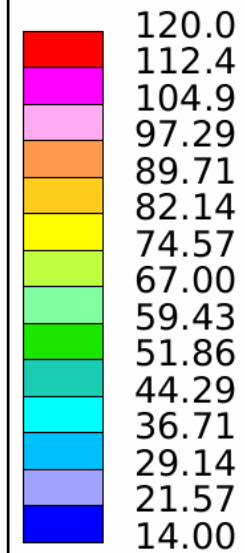




pro-STAR 3.2

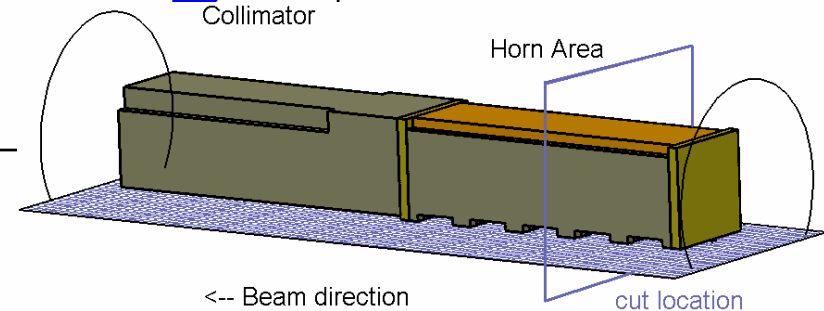
11-APR-05  
TEMPERATURE  
REL TO TREF  
(KELVIN)  
TIME = 190.050

Moritz Kuhn



Collimator

Horn Area



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



# TS/CV/DC CFD Group



**Thanks for your attention!**

**Any questions?**

**EDMS: 49 22 10**

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