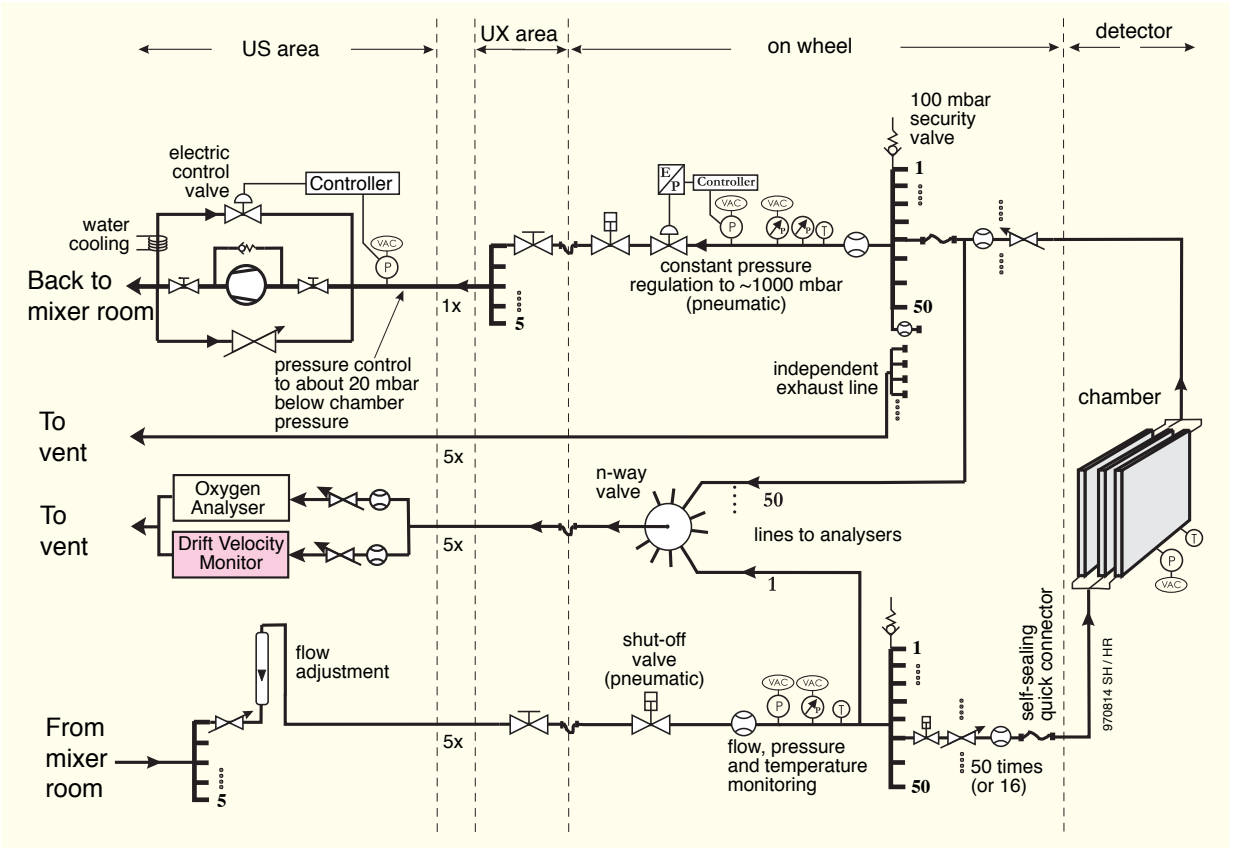
VdC, etc.

CMS Week 050620-24
Barrel Muon DT Session

VDC chamber, wheels and services

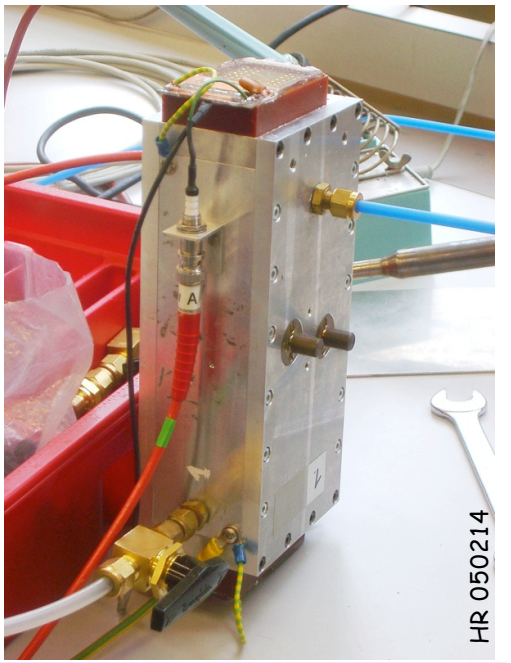
Hans Reithler / Aachen

Function of Vd-Chamber



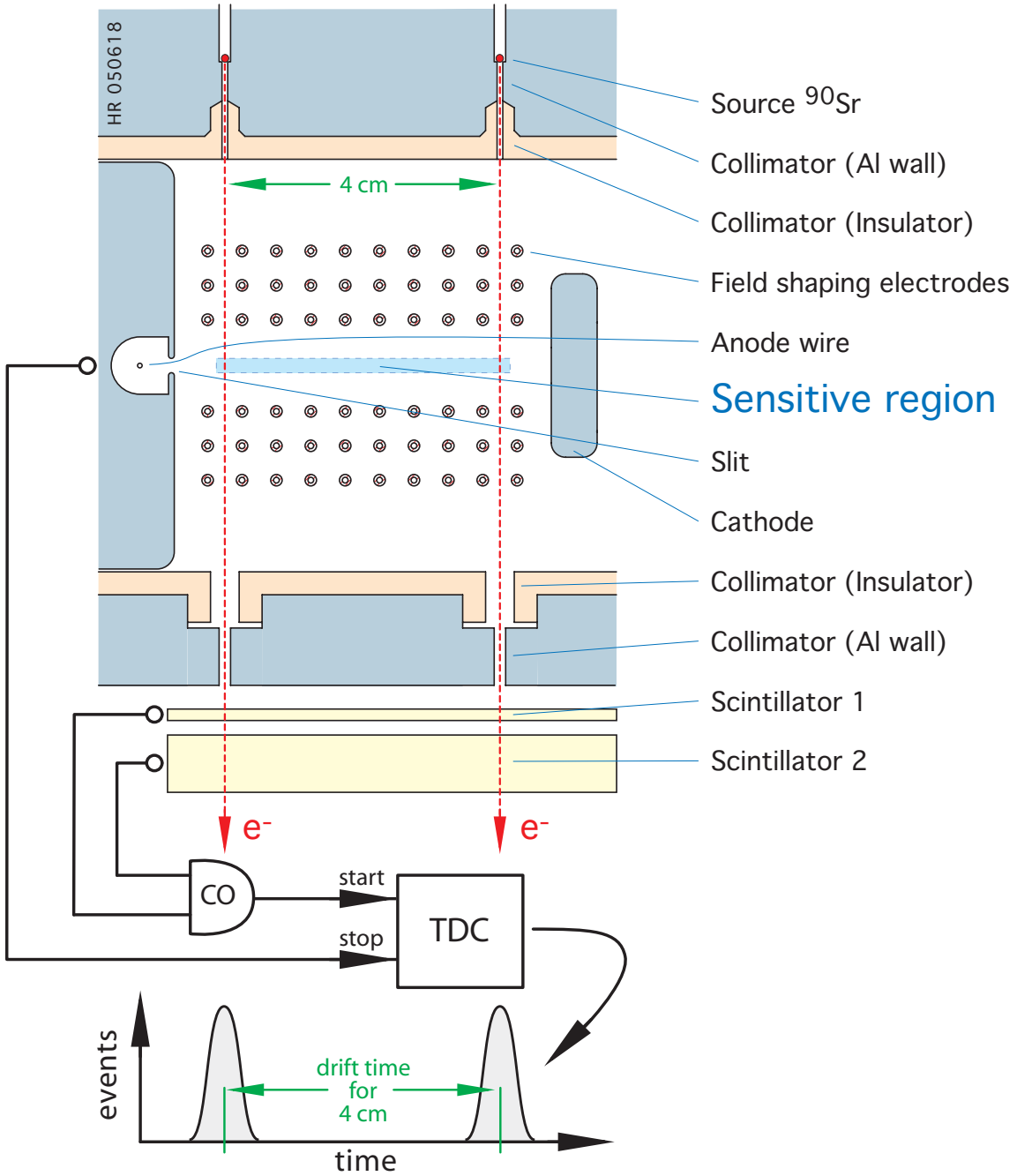
Gas circuit for CMS DT chambers (from Muon TDR)

- Monitoring of gas main parameters with **oxygen analyser** (commercial) and **drift velocity monitor VDC** (own development)
- Located in service cavern; one unit per wheel; samples gas outlet from every chamber in 1-2 days cycle
- Drift velocity Vd is monitored with a ~20 cm small drift chamber, "VDC" or "Vd-chamber", measuring in very homogeneous field.



- Principle of chamber (photo) for L3 experiment is very good.
- Redesign to stand voltage required for our gas mixture.

Principle of Vd-Chamber

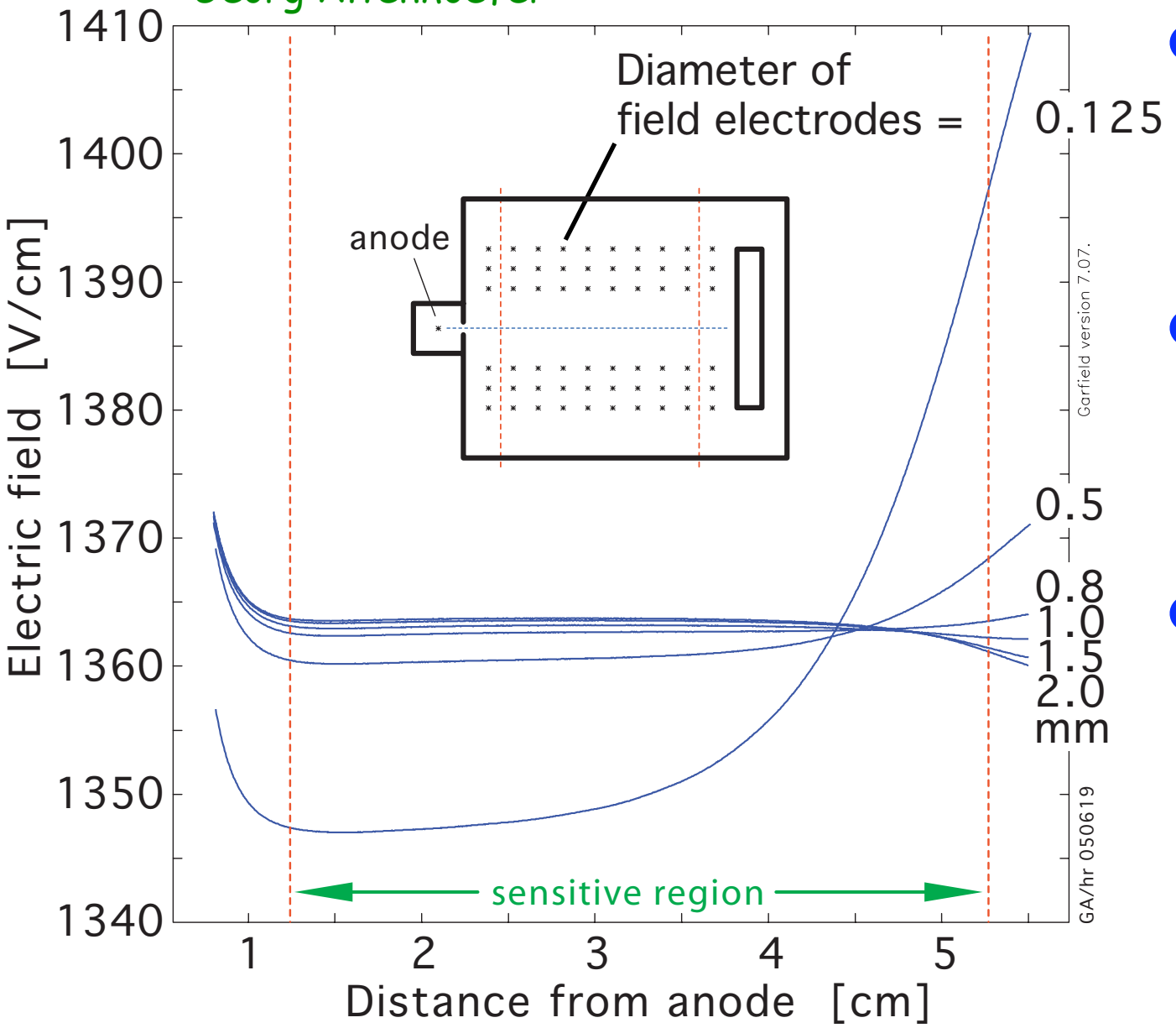


Principle and geometry of the Vd chamber

- Two collimated beams of electrons pass through the chamber and are detected by scintillators, which provide a trigger
- The drift times from both beams w.r.t. the trigger are recorded
- The difference in average drift time from both beams measures the drift time to travel through the 4 cm "sensitive region" of known uniform electric field
- Electric field in sensitive region can be varied
- Electric field needs to be homogeneous in the sensitive region only

Optimization of Vd Chamber

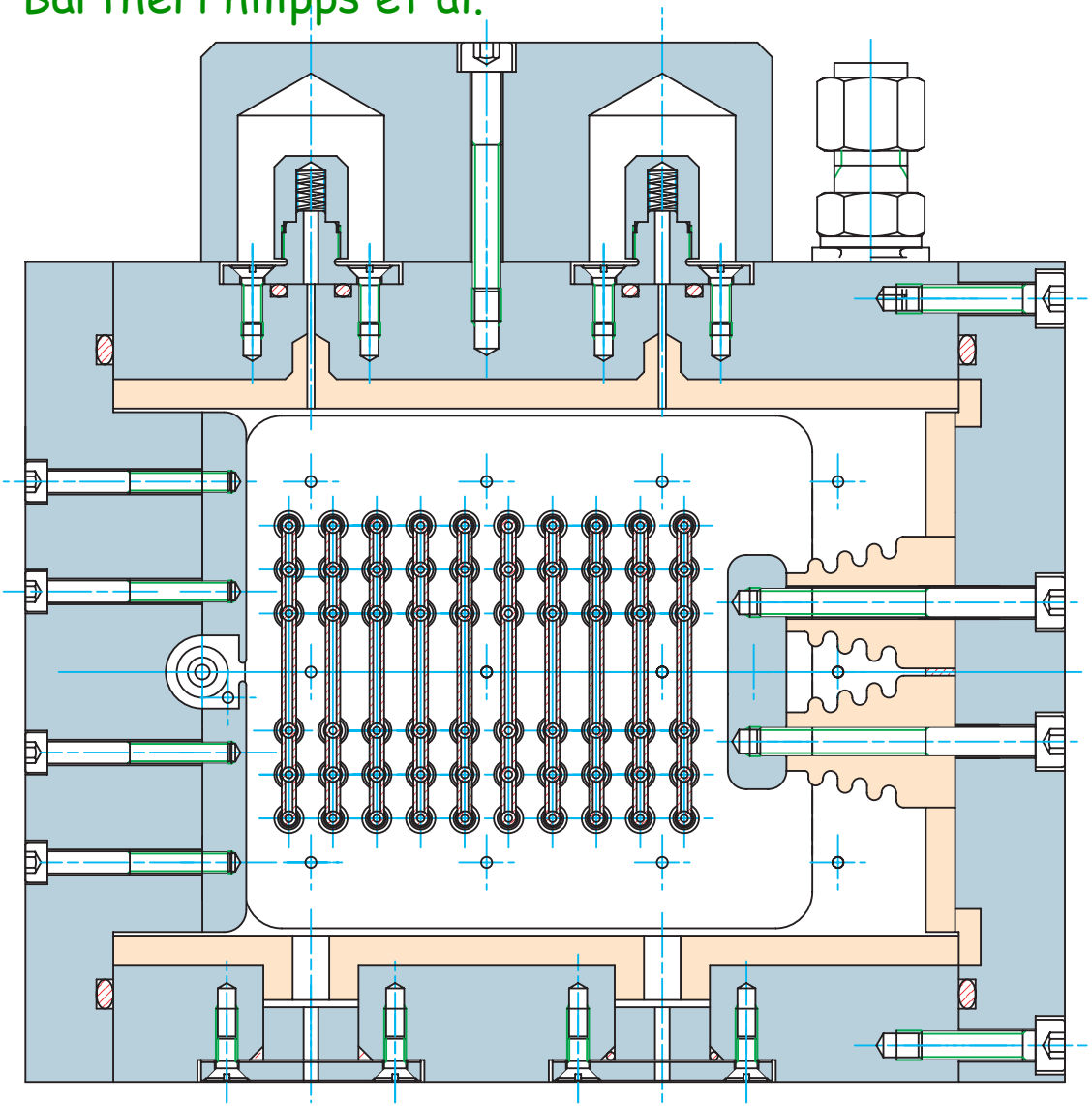
Georg Altenhoefer



- Systematic study to optimize the field homogeneity and to assess all sources of systematic errors
- Example: usual diameter of 0.125 mm for field wires is far from optimal; 1 - 2 mm is better
- Further aspects: wire spacing, cathode distance, tolerances, HV protection, space charges, multiple scattering, bias from scintillators, calibration, etc.

Vd Chamber Status & Next Plans

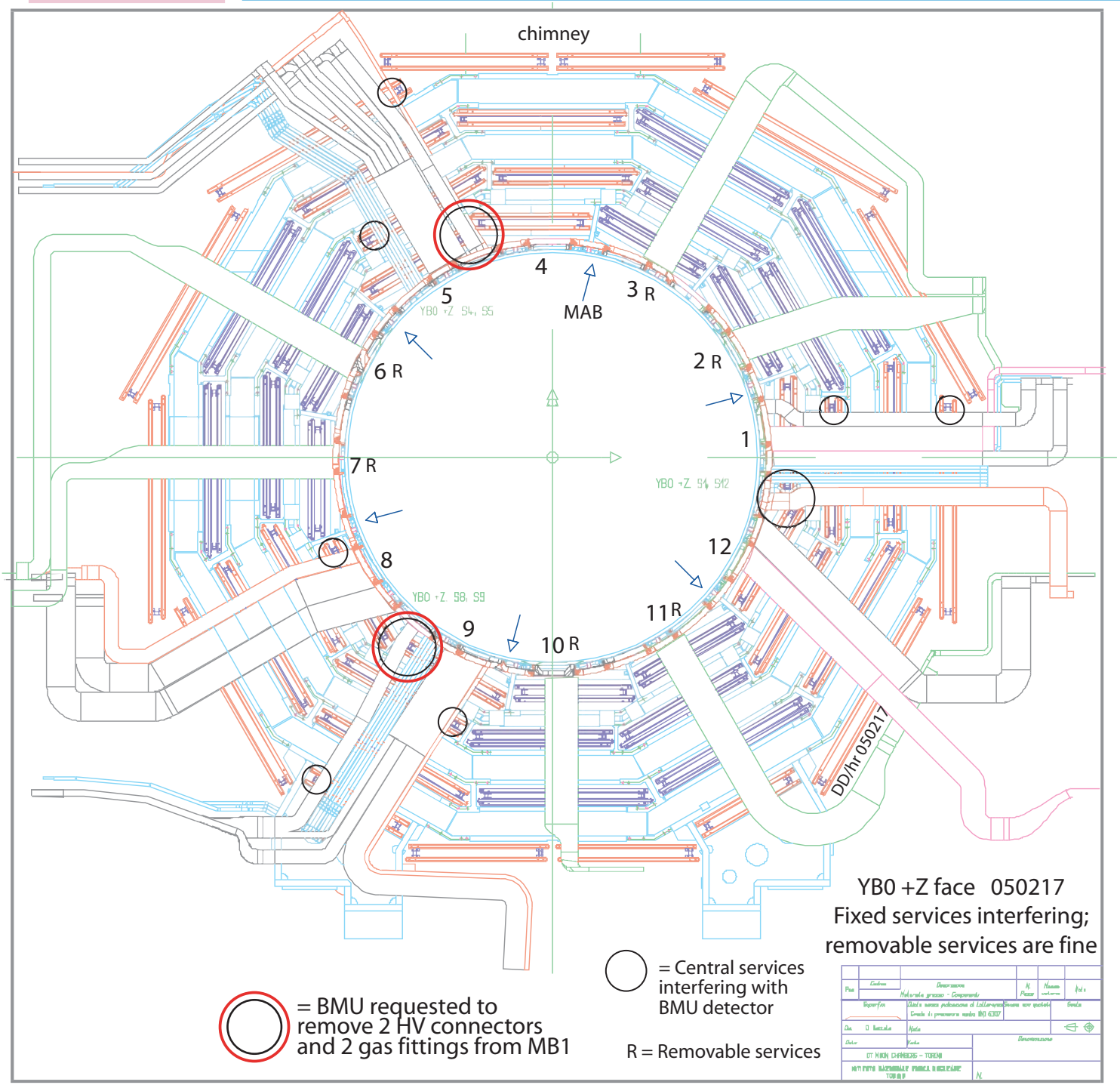
Barthel Philipps et al.



One view of the technical realization.

- Status: optimization for main dimensions done and a prototype is in preparation at Aachen
- Continuation of the project in collaboration with Debrecen - Gyula Zilisi helped by others -, who will focus on the DAQ system
- Aachen will further focus on the Vd chamber construction and optimization
- Aim is to build and test one prototype Vd chamber this year and the mass production (1 Vd chamber per wheel, plus spare) in 2006.

Interferences on Central Wheel



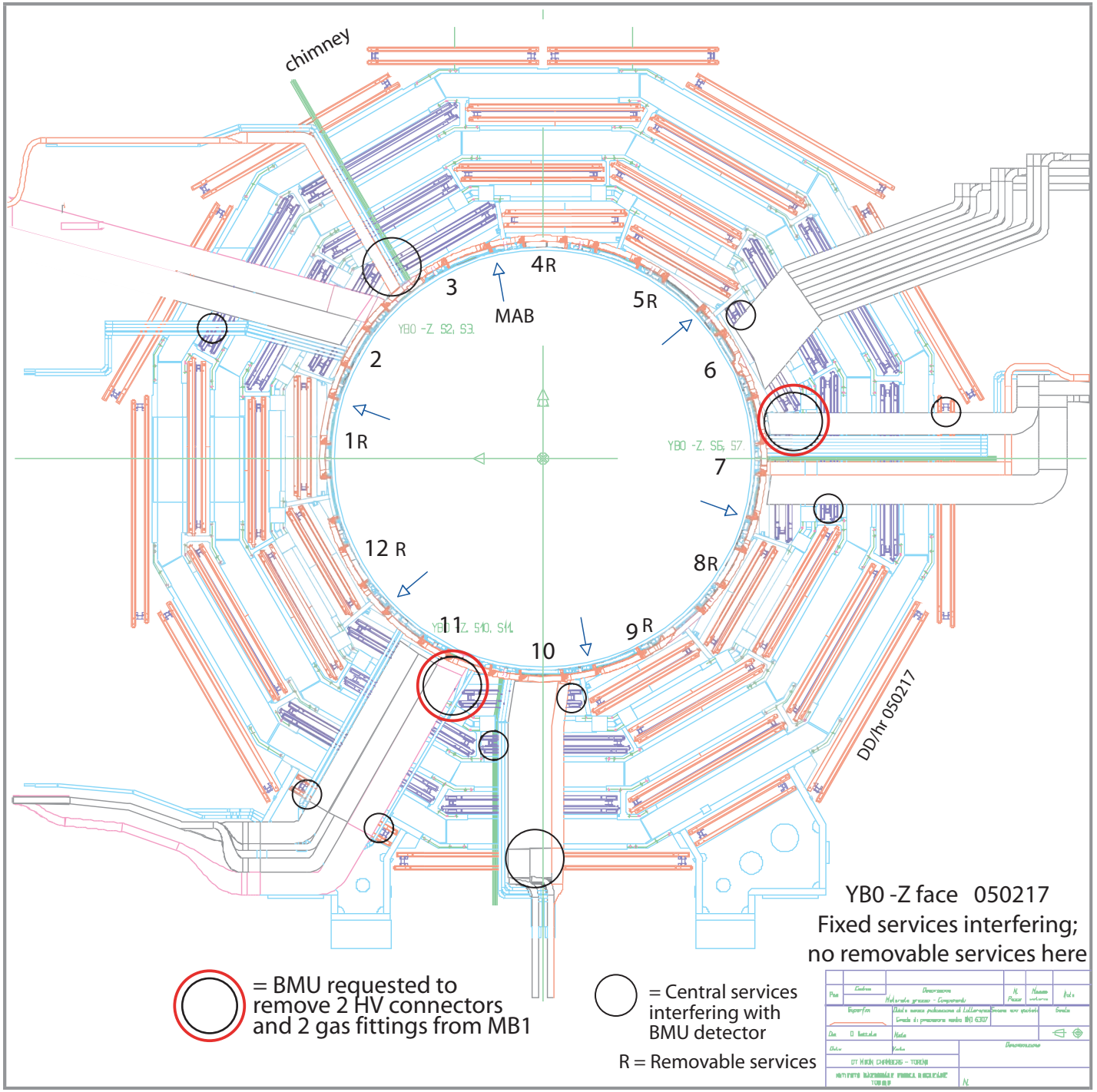
Central services found to interfere with BMU system at several points (see circles).

Interfering with gas connector, with HV connector, or obstructing light passage for alignment.

Interferences on +Z and on -Z (next slide) face of wheel.

Some interferences trivial to solve, others require more work....

Interferences on Central Wheel



BMU group has been requested to modify four MB1 chambers to gain some space.

Modification of 4 MB1 is being done.

Drawings proving that all interferences have been removed should be produced urgently - otherwise risk to find these interferences again while installing CMS.

Cooling Piping

- Piping on wheels is partly different from general drawing: each second wheel has inlet and outlet of subcircuit (feeds two BMU stations) swapped.
- As far as the flow limiters are installed in accordance, and the circuit within the BMU stations are symmetric, this swap would not jeopardize the utilization of the circuit.
- To avoid possible problems when opening the cooling circuit for e.g. chamber maintenance, the addition of colored labels to indicate SUPPLY and RETURN were proposed.

Possible additional labels on cooling pipes

- It appears that the cooling circuit within each pair of BMU stations has not been made symmetric, but has been optimized for minimum heat delivery to the chambers. To exploit this feature, the assignment of inlet and outlet should be brought to nominal. To be settled urgently.