



Minutes of meeting:

## Discussion on MQYYM and MQYY prototype magnetic measurement (CEA, 05/07/2016)

### Presents:

CEA Saclay/IRFU: H. Felice (HFE), J. M. Gheller, (JMG), A. Madur (AM), D. Simon (DS)

CERN TE/MSC: L. Bottura (LBo)

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### Agenda items

The purpose of the discussion was to clarify which strategy can be adopted for the magnetic measurements of the MQYYM (short model) and the MQYY prototypes in terms of cold and warm measurements.

### Record of meeting

#### 1) Available documents at the beginning of the meeting and info on existing equipment

LBo has provided by email the drawings of an existing warm probe (60 mm in diameter) (lhcmwweq0395-AA and LHCMMWEQ0435-AA) and a sketch of the interface piece for the cold measurements.

#### CERN equipment:

LBo has mentioned several probes which could be available but this information requires confirmation by LBo and LFI. The list here is therefore only indicative and should be confirmed.

- 60 mm diameter warm probe, modular in length
- 42 mm cold probe, about 1 m measurement length

Cold probe weight is estimated to be approximately 15kg per meter.

CERN will provide the probe, the micro-rotation unit, the acquisition system.

#### CEA equipment

According to JMG there is an existing anticryostat (CETACES test station) at CEA with a useful bore of 48 mm. JMG needs to check the length, the outer diameter and the position of the welds. This could be an option for the MQ series.

## Q4 Project

### 2) Magnet Measurement of the MQYYM

#### Testing conditions of MQYYM

- MQYYM will be tested at CEA in a saturated bath (1.9 K and 23 mbar)
- The heat load do not account for an anticryostat

#### Identified potential issues

- *Regarding cold probes*
  - o The system cannot be used as is because it has been used in a pressurized bath where the sealing was not an issue. There is a concern from LBo that the sealing of the system will be difficult in the case of the saturated bath. JMG indicated that he thinks that this issue could be resolved but he needs to be able to have access to the detailed drawings of the system including the assembly concept on the top plate.

Any show-stopper should be identified as soon as possible.

**It is agreed that drawings should be provided as soon as possible by CERN and that a meeting will be held at CERN before the end of July to 2016 to converge on the strategy.**

*A doodle poll has been sent by HFE on 06/07/2016 to the participants.*

- *Regarding warm probes:*
  - o The use of the system requires the use of an anti-cryostat. The cryogenics of the CEA test facility for the MQYYM would need to be reevaluated.
  - o There is no appropriate existing vertical anticryostat. A new design would be required. The effort required to design and fabricate such an anticryostat appears to be too ambitious for a test foreseen in Summer/ Fall 2017.

**It is agreed that this solution will be considered only if the cold probe cannot be considered.**

#### **MQYYM magnetic measurements strategy proposed**

- **The cold probe is considered as the solution for the magnetic measurements of the MQYYM unless a show-stopper is identified in the coming weeks**

### 3) Magnetic Measurements for the MQYY prototypes

#### Testing conditions of the MQYY prototypes

- The plan is for now to test the MQYY prototypes at CEA in the vertical cryostat. The discussion is still ongoing. The assumption taken for this discussion is that the bath would be a double bath (upgrade of the facility with a lambda plate). The estimation of the cost to do the required upgrade at CEA is ongoing. This assumption has in any case to be validated by CEA management.

#### Identified potential issues and work to be performed

- Regarding cold probes
  - o LBo confirmed what was mentioned by LFi and SR during previous discussions which is there is still some technical difficulties in the use of the long cold probe (regarding control of the rotation in particular).
- Regarding warm probes
  - o The use of the system requires the use of an anti-cryostat.
  - o The design should be made. It is agreed that this is an interesting activity for both CERN and CEA. The design could probably be performed by CEA. Funding of this activity would need to be discussed.

## Q4 Project

- Under the assumption that CEA will test several types of magnets for HiLumi (MQYY, MQ, MQY?, MQM?), several anticryostats need to be considered.

### **MQYY prototypes magnetic measurements strategy proposed**

- **The warm probe + anticryostat is considered as the solution for the magnetic measurements of the MQYY prototypes.**

#### **4) Miscellaneous topics**

- Magnetic measurement resource at CEA

The importance to have available resource at CEA to understand and operate the magnetic measurement system (in both model and proto cases) has been mentioned.

This topic has to be discussed with PV.

- Cold bore

LBo stretched the importance of an inner tube in the model and proto to protect instrumentation wiring if any.

#### **5) Action items in preparation of the next meeting**

#### **CERN:**

- **To provide drawings of the existing equipment (probe/shaft, interface pieces, support...)**
- **To specify accepted material for anticryostat**

#### **CEA:**

- **To check the position of the magnet with respect to the top plate**
- **To check the characteristics of the existing CETACES anticryostat: the check has been made by JMG and showed that the anticryostat is too short for possible application in MQ.**