Meeting summary:
Collimator service needs for HiRadmat

26/11/2009

Present: Alessandro Bertarelli, Alessandro Dallocchio, Michael Jeckel, Ans Pardons

Meeting summary: (A. Pardons)

1. **General service needs for Phase 2 collimators in future HiRadMat test stand:**
   - **Water/cooling:**
     - Flow rate: 50l/min (but valves need to be fitted outside the "box" that restrict the water speed inside the collimators to <3m/s)
     - Cooling power: small (no special requests)
     - Incoming/outgoing temperatures: standard CERN demineralised water circuit
     - Pressure: ~15 bars (LHC: 9-17 bars)
   - **Electrical/signal cables & connectors (Contact person: Alessandro Masi EN/STI):**
     - Needed: Phase 1 connectors + coaxial cables + test probes + … (get complete list from A. Masi)
     - The standard patch panel (as installed in tunnel + some extra connectors) should be copied for the test stand. The test stand should have several patch panels over its 10 meter length, from which 1 will be dedicated to the phase 2 collimators
     - General electrical cables for vacuum pump (220/380V?)
   - **Cryogenics:**
     - A future interest in testing "cryo-collimators" is expressed, but this will not be included in the baseline specification for the test area.
   - **Vacuum:**
     - Collimators+their BLM will come with their own vacuum pump, no "general service" vacuum needed

2. **Phase 2 collimator requests regarding accessibility, space, installation:**
   - Doppler Laser-vibrometer is needed as measurement device during tests. The laser can be placed outside the WANF area (TNC), laser transmitted by mirrors. Contact person: Herta Richter.
- A high speed camera is needed as measurement device during tests. It can not so easily be displaced (mirrors unlikely to work) and will not withstand the radiation dose in the area. Other possibilities (as in MERIT?) Contact person: Ilias Efthymiopoulos

3. Remarks:
- The hydraulic plug-in connectors must be able to withstand 50 bars, connectors currently used for phase 1 collimators (Staubli) can be used. Additionally, they withstand ~10MGy.
- Weight of one phase 2 collimator: max 750kg
- Regarding alignment, ideally the entire collimator tunnel support & pre-alignment base is copied for the HiRadMat area (see drawing LHCTCS__0617), including its plug-ins for hydraulics and patch panel. Check that there is enough height available under the HiRadmat beam axis (~500mm needed) Action: Michael Jeckel
- The team of Keith Kershaw is developing a remote-installation system that might be useful for HiRadMat.

4. Information obtained after the meeting
(regarding vacuum windows downstream of the collimator (Ilias Efthymiopoulos))

The core of the muon dump (~3.5m downstream of the test stand) will most likely consist of a modified "TED" dump, this object works under vacuum and has its own entrance beam window (contact person: Oliver Aberle)

However, to avoid contamination of the TED vacuum AND to avoid connection/disconnection interventions so close to the radioactive dump, the TED vacuum is disconnected from the "test object" vacuum.

This means that a ~3m vacuum tube with exit window will be provided by the HiRadMat team, with a standard flange unto which each test stand/user can come and connect the downstream part of their test box.

5. Additional Remarks (A. Dallochio)

1. Although nominal water pressure is expected to be not above 15-17 bars, please consider in specifying this equipment that a pressure shock wave generated in the collimator cooling circuit during the operation could propagate in the water lines (upstream and downstream). The pressure peak is not known as it will depend on the final design of the collimator jaws: however we have already pre-designed our system so to withstand 100 bar.

2. For the design of dumps and windows systems please consider as a worst case the hypothesis that the full facility beam "misses" the collimator jaw(s) and it is entirely taken by these devices.