Summary of the MEC workshop, 14-Dec-2017, at GSI

The agenda and all the talks can be found here: https://indico.gsi.de/event/6681/

MVD

Daniela Calvo provided an update on the MVD mechanics. Regarding the services, the mock-up, a 1-to-1 scale, with all the DC-DC converter, all opto-electronic boards and with all cables and pipes required has been completed. This includes the GBT chipsets and their thermal bridge to cool down these parts. Based on this mock-up just the limit of the cables defines an outer diameter of 340mm.

Including a space of 10mm radial, to allow for the right arrangement of all the cables and the positioning of a shield, the MVD services request a space of 360mm outer diameter.

In addition to this, we need to define the clearance between the MVD and the calorimeter.

Further work was shown on the MVD barrel staves. A flex-PCB prototype is being designed, to perform initial tests for gluing and wire bonding.

Backward Endcap EMC

The Backward Endcap EMC update on the mechanics and its geometrical constraints was shown by David Rodriguez Pineiro. This included the Mounting Plate, the Cooling Shells, the VIPs (Vacuum Isolating Panels) and the Outer Cover. The current design defines an inner radius of 165mm or 330mm in diameter.

This however is too small, already for the MVD request from June 2017 for an outer diameter of 340mm, and now after the mock-up completion for an outer diameter of 360mm plus the clearance between the MVD and the calorimeter.

Considering the current cross-sections, of the cooling shell (18mm), VIPs (10mm), outer cover (4mm) and a clearance (10mm), the current design of BWE-EMC, looses a space equivalent to 10 crystals within a quarter or 40 crystals in total.

A proposal to use VIPs with smaller cross-section and Al-cover on one side, put forward by Lars, will be followed up.

Still, it remains to be investigated if the MVD request of 360mm outer diameter plus the clearance to the MVD, can be accommodated in the space left when 40 crystals are removed.

This clearance, still must be defined.

Additional work would be needed to re-design the crystal enclosure modules and their services.

Barrel EMC

Valeriy Ferapontov showed presented in two talks the two installation options for the Barrel-EMC. Option A is the original concept of assembling all the EMC slices to a barrel outside the cryostat and then insert the complete barrel into the cryostat. Option B is a new concept whereby the individual slices are installed into the cryostat thereby building up the barrel inside the cryostat slice-by-slice. The mechanical requirements as well the technological tools needed for both options were shown. It was clearly stated that option B poses higher requirements on clearances and bears more drawbacks, particular when re-adjustment would become necessary, since access to the slices inside the cryostat is limited. A list of pros and cons was presented, and some points need further investigation.

During the workshop the groups of the cryostat and the Barrel-EMC had the opportunity to discuss their mechanical interfaces and arrive to a design whereby the cryostat can accommodate both options.

Also shown were pictures of the slice assembly site at Giessen University, and the tools and the actual assembly process of complete super-modules to the back-plate of a slice.

Forward Endcap EMC

Thomas Held presented details of several topics for the FEW-EMC mechanics, assembly and installation.

Additional Drilling of threaded (holes) to the Support Frame is necessary to mount SADC crates, THMPs, light pulse units and the Disc DIRC.

The Latest Loading-Simulations from KVI show a displacement down and a tilt of the FWE-EMC frame. These should be checked and cleared with the Disc DIRC group.

A base to support the mounting frame (used for Preassembly and transport of the FWE-EMC) has been build, inspected and accepted. This support-base will be used to lift the mounting frame to the necessary height for use in test-beams in Jülich.

To mount the sub-modules to the backplate of the FWE-EMC a Manipulator-Arm will be used; which will be borrowed from the CMS experiment.

There appear to be Cabling Clashes with the Disk DIRC. In a recent query the Disk DIRC needs space for its services, which however is now all assigned to the FWE-EMC. More details were discussed in the Disc DIRC talk.

Disc DIRC

Updates on the Disc DIRC were shown by Erik Etzelmüller. A conceptual design has been developed towards the final detector design, with cross-sections of the services and their routing possibilities within the different cable-ducts.

For easier assembly a concept to use the mounting plate (MP) to guide cables on the outside of the detector (facing the IP) has been adopted.

Since the Disc DIRC is supported by the FWE-EMC frame, any deformations may have an impact. Currently, the deformations reported appear small enough without impact. However, the impact of a quench remains to be clarified and checked.

More space appears to be allocated to the FEW-EMC than expected from previous drawings. However, even the previously allocated space is now insufficient at some locations, due to changes and variations of electro-optical components of the Disc DIRC.

To alleviate cable clashes in the readout region a request with design proposals is put forward by the Disc DIRC group to consider a different geometry of the SADC crate providing the needed space for the Disc DIRC cables. This may require different connectors for the FEW-EMC but otherwise leaves their cabling intact. The proposal is being investigated.

Barrel-TOF

Ken Suzuki presented the mechanics status and the installation procedure of the Barrel-TOF. The Barrel-TOF is fully encapsulate in the mechanics structure of the Barrel-DIRC. The common mechanical frame has pockets so that each of the TOF super modules can be inserted individually. The super-modules have no readout or other services protruding, only connectors for cables/pipes. The cross-sections are defined, and the cable routing is assumed to follow the same path/ducts as that for the Barrel-DIRC.

During the workshop the groups of the Barrel-TOFand the Barrel-DIRC took the opportunity to discuss their mechanical interfaces.

Target – Connections and Supply

Benjamin Hetz gave a presentation on connections plans and supplies of the Cluster-Jet Target, Beam Dump and its interfaces to other modules.

This included a detailed scheme of the supply connections and the on-spectrometer platform wiring.

It is proposed to have two separate located distribution patch panels, for power, gas, coolant etc., with the necessary connectors, one on the Target Spectrometer platform and the other on the Beam Dump platform.

Regarding the Hydrogen Gas/Purifier System, its location should be somewhere near the solenoid, however, the space such system occupies must be clarified and more details are needed from the responsible Vienna group. A system which with a footprint fitting inside a rack should be considered.

Requests were re-iterated for the locations of the Cluster-Jet Target Rack and the Beam Dump Rack.

A preliminary sketch of the target/station location and the beam dump backing dump line were shown, however, planning of the pumping line routing is on-going.

The question of which target status information should be shared in which manner, must be addressed further.