

Minutes Beam pipe and ITS, FMD, T0 and V0 meeting.

Action points

The ITS should define an interface for the third cone, before 8 February.

The ITS should be ready to define the space envelope for the FMD for the next engineering meeting (4 March).

The FMD group should modify the design of the third cone, in accordance with their requirements.

Main points beam pipe meeting

The installation scenario as viewed by the ITS group was presented.

The main problems currently are related to the actual support and handling of the beam pipe during the installation and what demands are on the beam support.

There are currently no clear ideas about the shape of the supports of the beam pipe direct in front and behind the ITS. This is due to many unknown factors, the main factors are the shape of the FMD and its support and the requirements of the beam support itself. For the RB 26 side (muon plug) space is reserved in terms of the third cone, for the RB 24 side there is no clear idea for similar kind of construction as the third cone, though in the current view we suppose that there is sufficient space to accommodate both the support of the beam pipe and the FMD.

The vacuum group will take responsibility for the design of the beam pipe support and handling during installation. This includes the tooling necessary for installation. As there are also demands on this tooling from the side of the ITS, Luciano Simonneti has put forward a proposal which would accommodate the requirements of the ITS.

The alignment procedures for installation need further discussion. Currently it is being assumed that the ITS and its components will be aligned to the beam pipe. Though to allow the ITS to be connected to the TPC, while a minimum of stress is introduced to the beam pipe, the ITS needs to be installed 1 mm below the final beam pipe central axis. The implications for all the alignment steps and the final alignment of the beam pipe are not yet all understood. The final alignment of the beam pipe will be determined by the positioning of the TPC.

It has to be verified if special precautions for supporting the beam pipe have to be taken during the movement of the TPC, as this will result in deformation of the space-frame.

Main points ITS, FMD, T0 and V0 meeting.

Main aim of the meeting is to determine the space requirements of the different detectors and to sufficiently define boundaries to allow the design of the support of the beam pipe.

As this overlaps with the discussion on the beam pipe, the points of that meeting will not be repeated.

A main problem is the conflict in space requirements between the ITS and the Si₁ outer of the FMD at the RB 26 side (muon plug side). The requirements show an overlap between the ITS and FMD at the outer diameter of the Si₁ outer. A main argument in the discussion is the overlap between the pixel detector of the ITS and Si₁ outer of the FMD.

For the ITS the problem is the space required for the feed through of the services and the second cone for supporting the pixels and depending on the design the space required for the third cone.

For the FMD the position of the Si₁ outer is based on the following considerations:

- Largest possible coverage in eta.
- Largest possible symmetry between left and right
 - Consistency
 - Fluctuations
- Redundancy ITS, FMD and V0
- Costs of assembly
 - The number of masks needed for production
 - The requirements from different types of assemblies

The average coverage in eta of the current design of the pixels is 1.9.

For physics performance a minimum overlap of 0.2 and average overlap of 0.3 is required.

To this end the Si₁ outer will be redesigned for a minimum average coverage of 1.7.

The position of the Si discs has to be optimised so to leave a minimum gap between Si₁ and Si₃. For physics a minimum overlap of 0.1 and an average overlap of 0.2 would be acceptable.

For the FMD the inner radius of the Si discs should not be smaller than 41.5mm, this to ensure sufficient clearance with the beam pipe.

The FMD boxes can be assumed 30mm, except at the outer diameter, for connectors the box should be assumed 50mm.

For installation purpose the FMD should ensure there is sufficient clearance between the two halves of a disc.

To avoid problems during installation the FMD should be pre-cabled, when it is installed.

V0, main points.

The V0 should be assumed 5 mm thicker.

The inner radius of the V0 is minimized to allow for maximum overlap, to this end the first flange of the vacuum pipe has been moved. To this end the T0 is moved to a larger diameter, still pointing at the interaction point. The improvement of the coverage of the V0 has to be carefully weighed against the implications of the movement of the flange. Especially any impact on the performance of the muon arm should be avoided.

T0, main points.

In the current design the T0 is supported from the absorber, it is proposed to support the T0 from the V0 and lead the cables from the T0 between the V0 and the absorber. To be reviewed is whether there is sufficient space between the absorber and the V0 to allow for the routing of the calibration fiber of the T0.

ITS, main points.

Before the next engineering meeting the ITS will review it's space requirements for services and the cones, so a definite space envelope for the FMD can be drawn.

The function of the services support plate will be combined in the third cone, to avoid conflict service support plate and the other detectors. To this end the engineers of the Torino group have to define the interface requirements before the 6th of February.

General

The space for the services should be carefully monitored, though the main responsibility is at the side of the ITS.

The FMD group should modify the design of the third cone, based on the latest proposal from Charles Gregory, to accommodate their needs.

The vacuum group should verify the design on their requirements for supporting the beam pipe. The ITS group should verify the modified version, to see if it meets with the requirements for replacing the service support plate.