

# Assembling procedure of the SPD detector

(хотелки в картинках)

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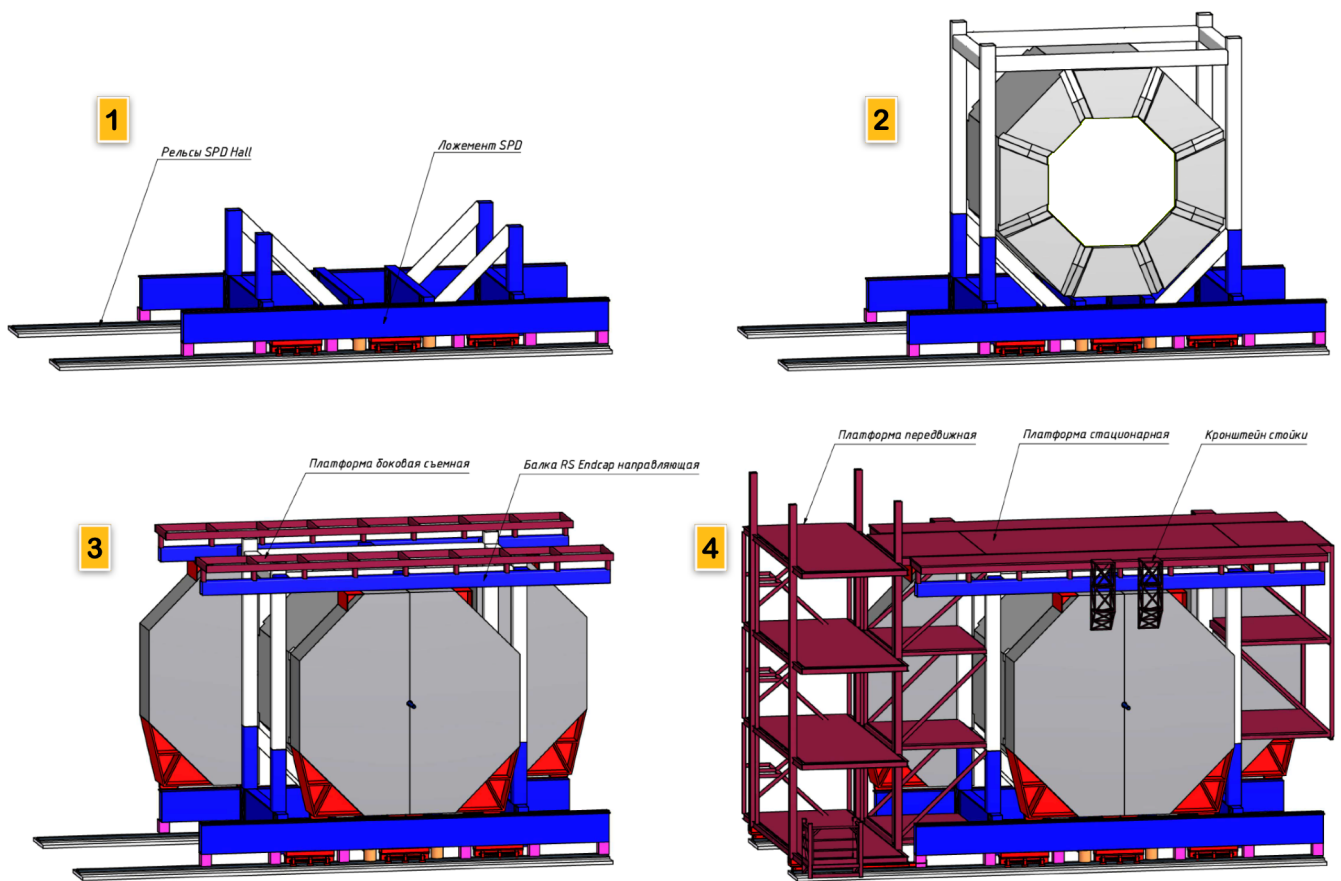


Рис. 1: (1) Installation of the lower part of the movable lodgement. (2) Installation of the barrel octants of RS with a support structure. (3) Installation of the RS endcaps. (4) Installation of top and side platforms for cryogenics and electronics.

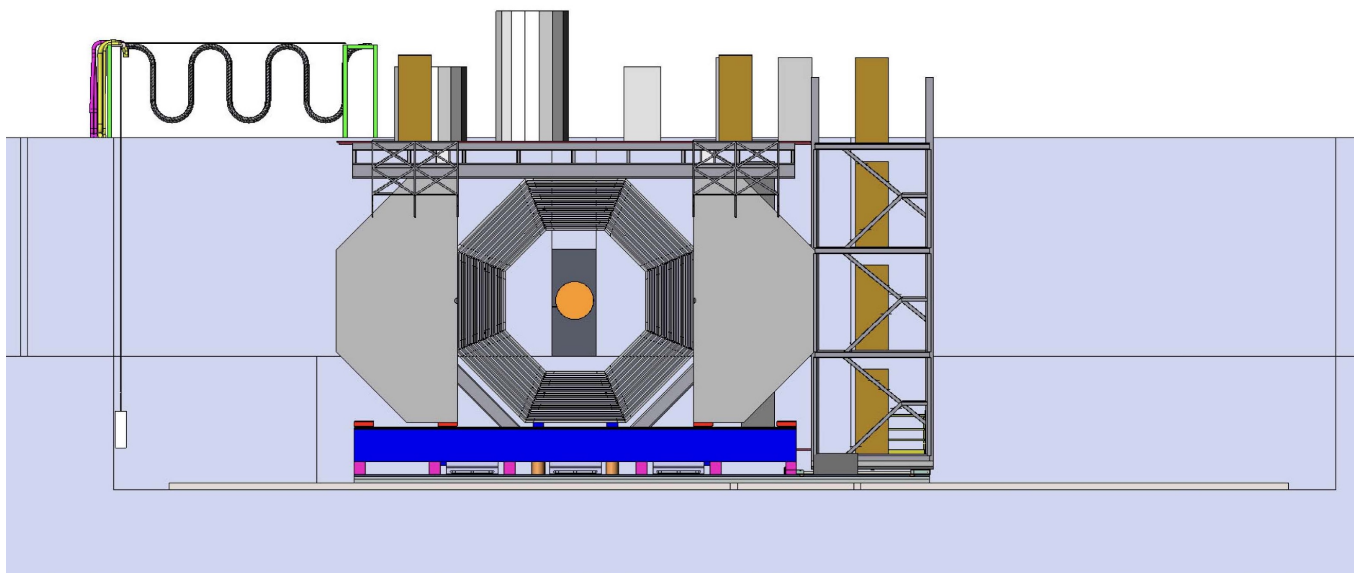


Рис. 2: Once the upper and side platforms are ready, one can start installing cryogenic equipment, electronic racks, set cables and gas pipelines. This step, however, can be postponed to the moment after the magnet is installed (see Figs 3 - 8 ).

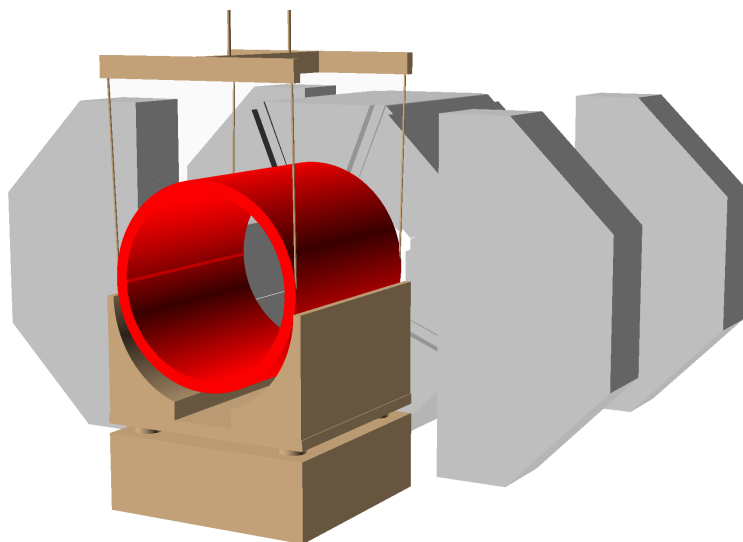


Рис. 3: (Var-1) The magnet is lowered by a crane into the cradle. The cradle contains four lifting jacks for adjusting the height and aligning the magnet with the RS barrel. The weight of the magnet is 16 tons.

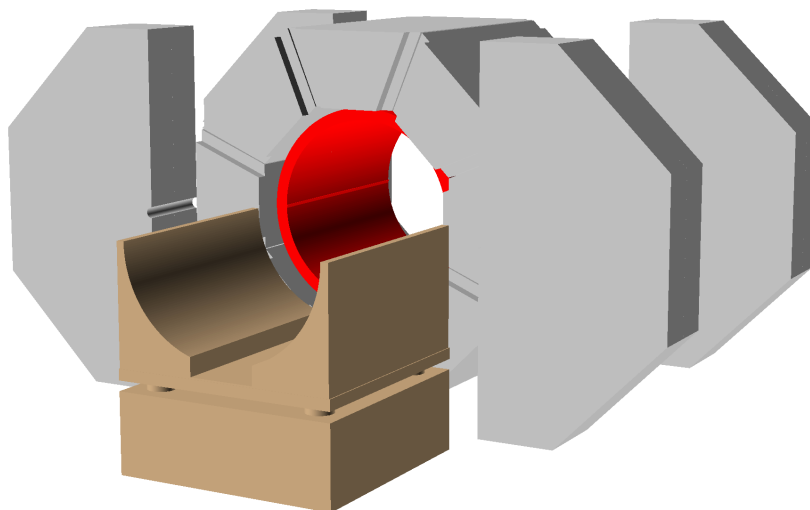


Рис. 4: (Var-1) The magnet is transported in the axial direction to the working position. The location of the guiding equipment (rails and rollers) to be defined.

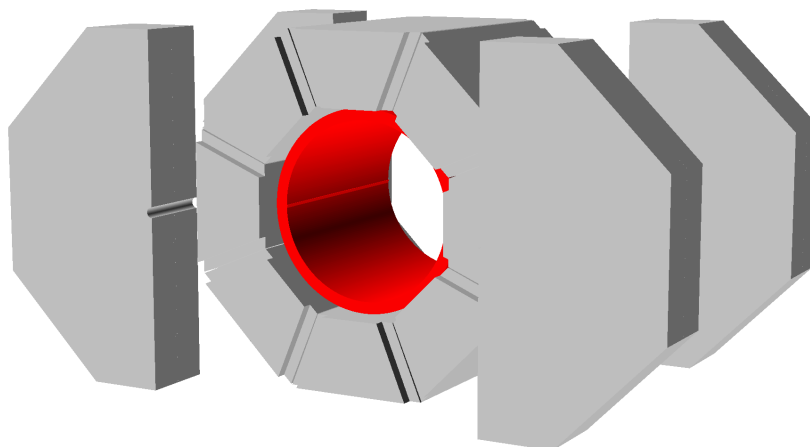


Рис. 5: (Var-1) Final configuration with the magnet installed and bolted to RS.

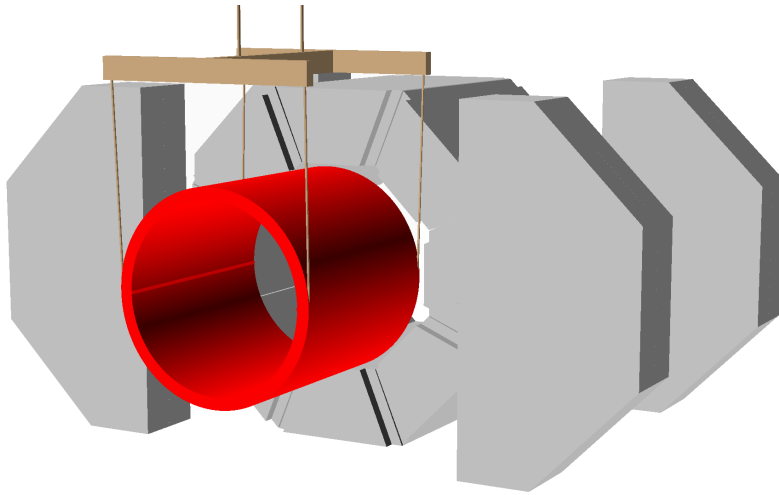


Рис. 6: (Var-2) The magnet is lowered by a crane and held in the position to make it coaxial with RS.

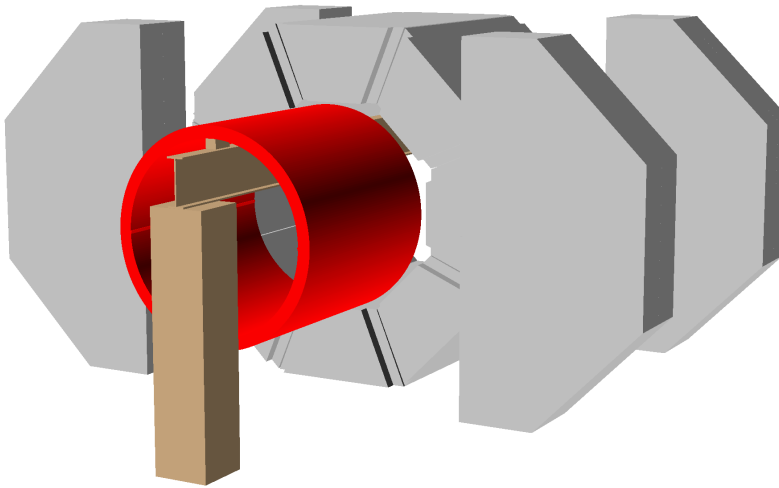


Рис. 7: (Var-2) The guide beam with a rail is threaded through the magnet and fixed to pillars on both sides. It is necessary to check how feasible this procedure is, since the length of the beam is 12 m. The deflection of the beam is the second issue that needs to be worked out, since the weight of the magnet is 16 tons and the gap between the magnet and RS is only 2 cm.

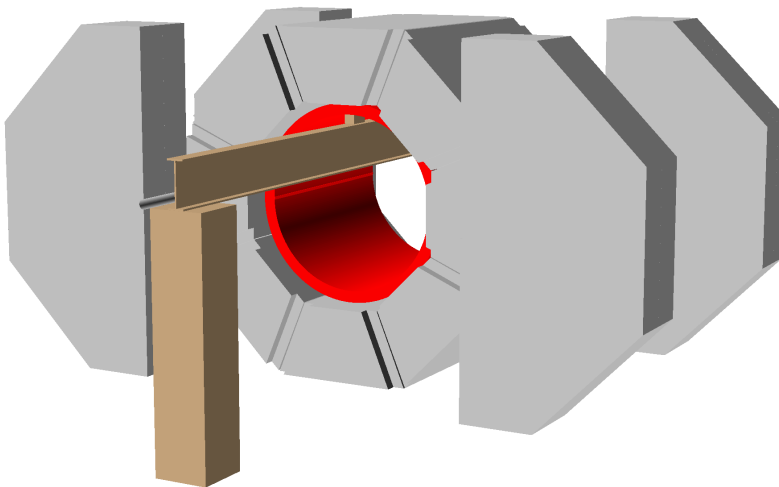


Рис. 8: (Var-2) The magnet is moved on rollers along the rails to its working position and bolted to RS.

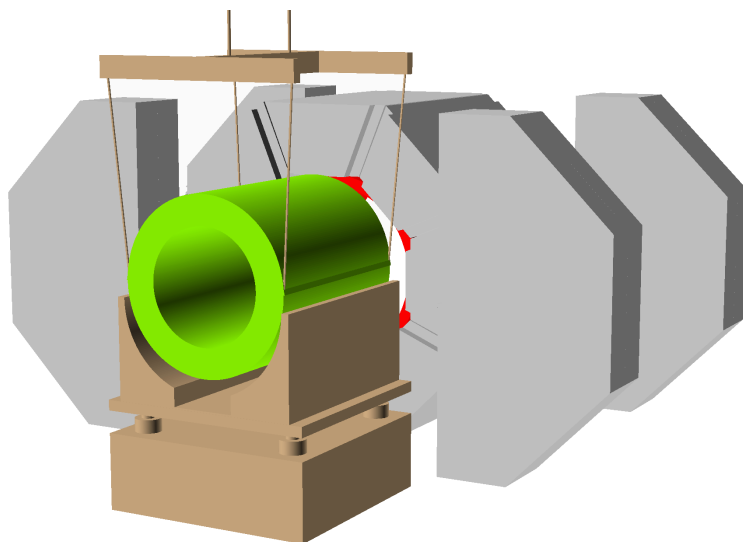


Рис. 9: The ECal barrel is lowered by a crane into the cradle. The lifting platform of the cradle can be the same as for the magnet (see Fig. 3) but the vise mechanism to be adjusted to the new size. The weight of the ECal barrel is close to 40 tons.

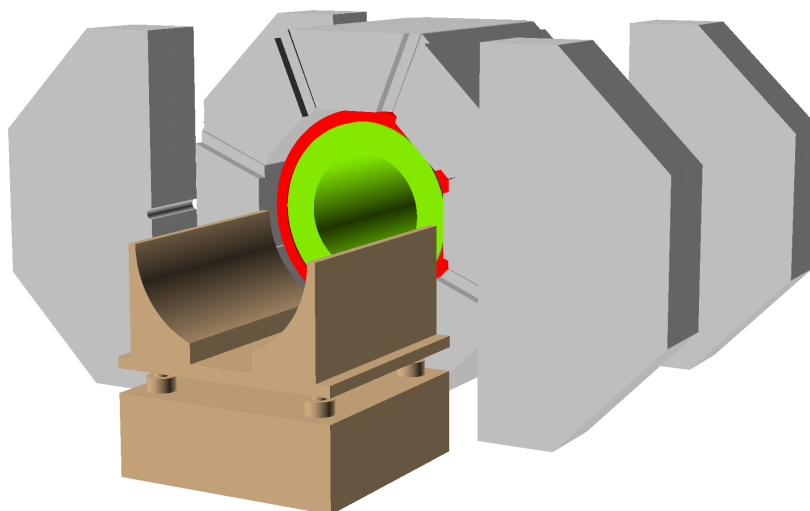


Рис. 10: The ECal barrel is moved along the rails to the working position. Two fixation options are under consideration: (1) hanging ECal on the magnet, (2) ECal is supported at its ends (fixed to RS).

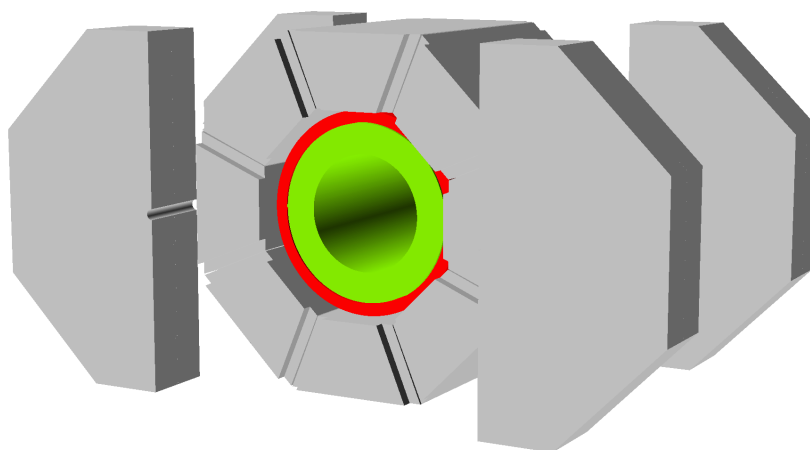


Рис. 11: Final configuration with the ECal barrel installed.

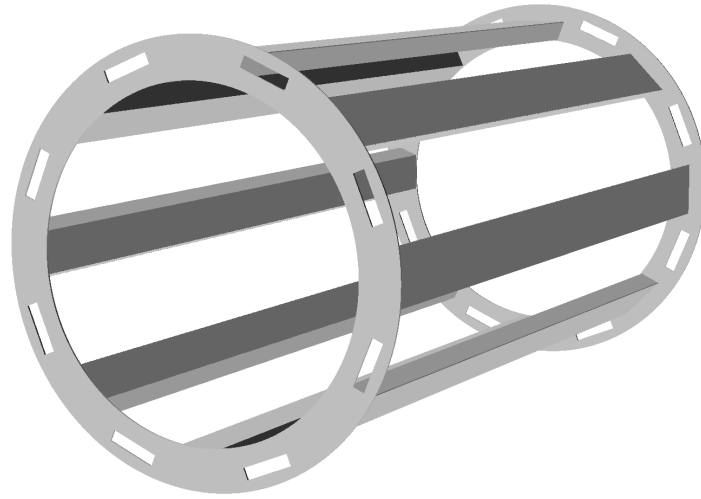


Рис. 12: The possible option for the frame of the TOF barrel: two rings connected by hollow profiles. This frame has to withstand a weight of 3-4 tons (mainly the weight of MRPCs).

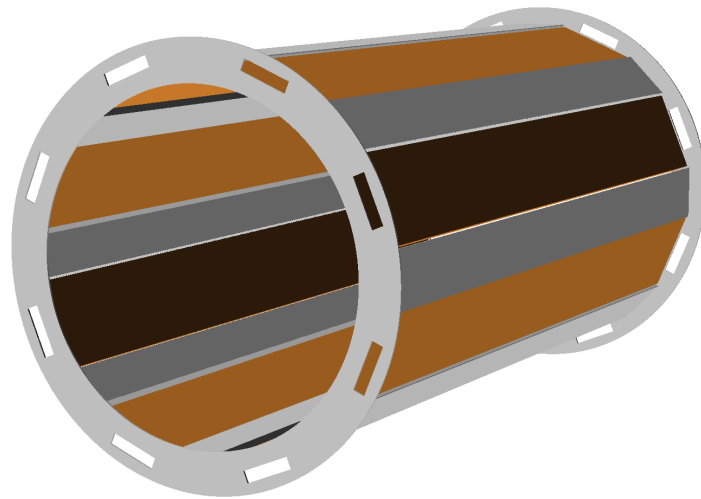


Рис. 13: The TOF barrel with inner layer of 8 MRPC-supermodules installed.

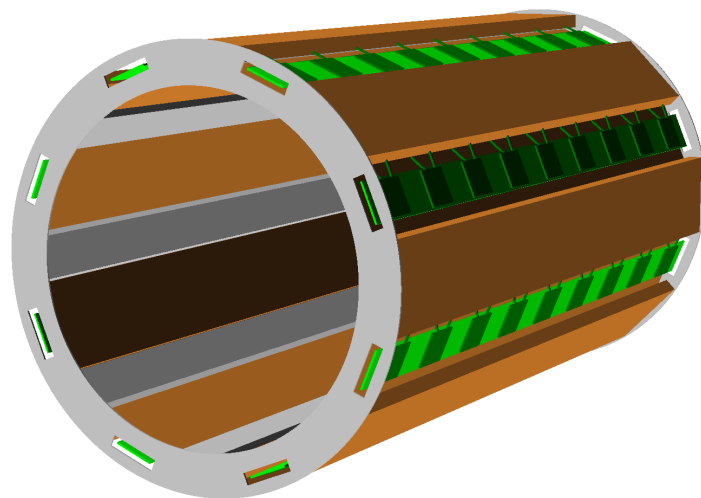


Рис. 14: The TOF barrel with inner and outer layers of MRPC-supermodules installed.

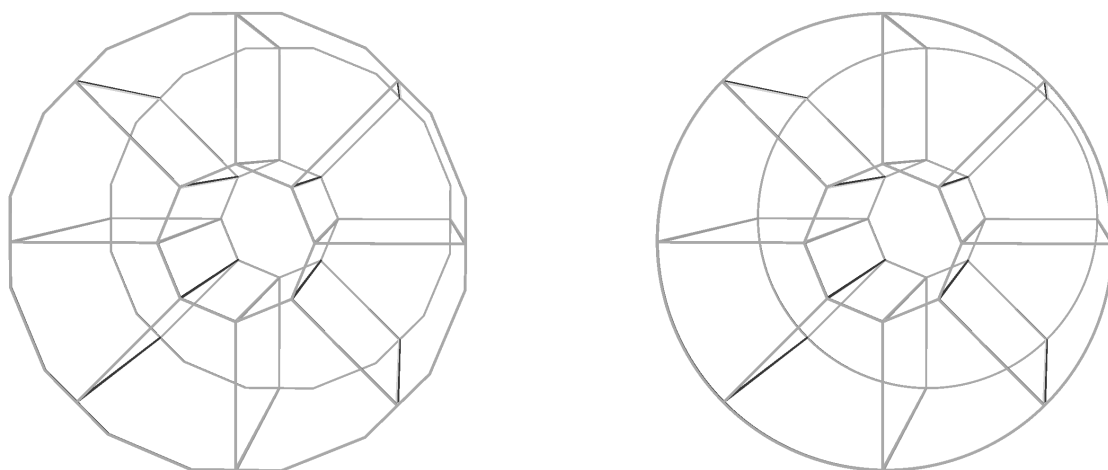


Рис. 15: Two possible designs of the ST frame with the external shape in the form of hexagonal prism (left) and cylinder (right). In both cases, the central part of the frame is represented by an octagonal prism.

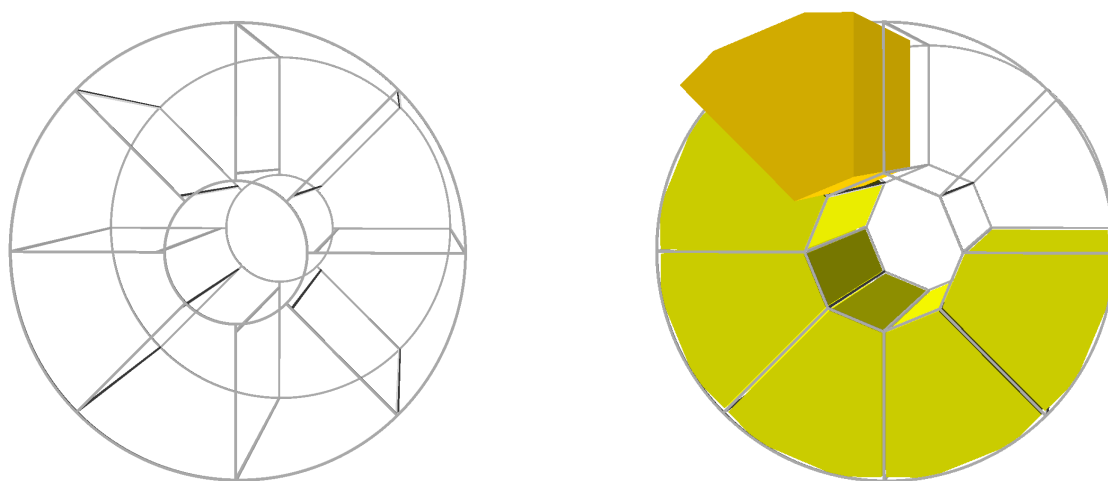


Рис. 16: *Left*: the design of the ST frame with internal and external shapes in the form of cylinders. *Right*: the ST frame partially loaded with the straw modules (octants). The weight of the ST barrel is about 100 kg.

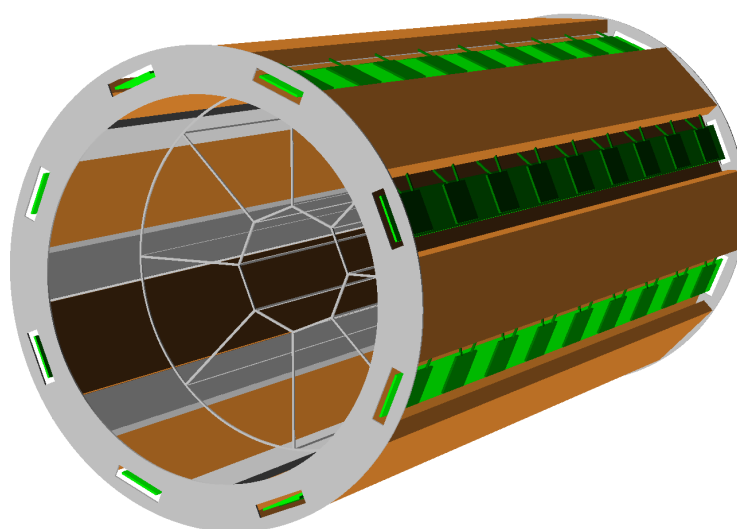


Рис. 17: The ST frame inserted inside the TOF barrel.



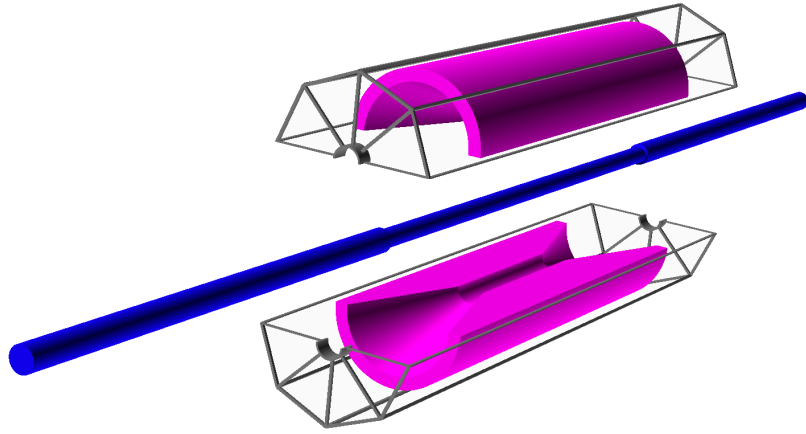


Рис. 18: The beampipe and two halves of the VD detector which are fixed on two half-cages. These two half-cages form a load-bearing power element that carries the weight of the VD and the beampipe. The weight of VD in its MM option is close to 40 kg. The silicone option of VD is much lighter.

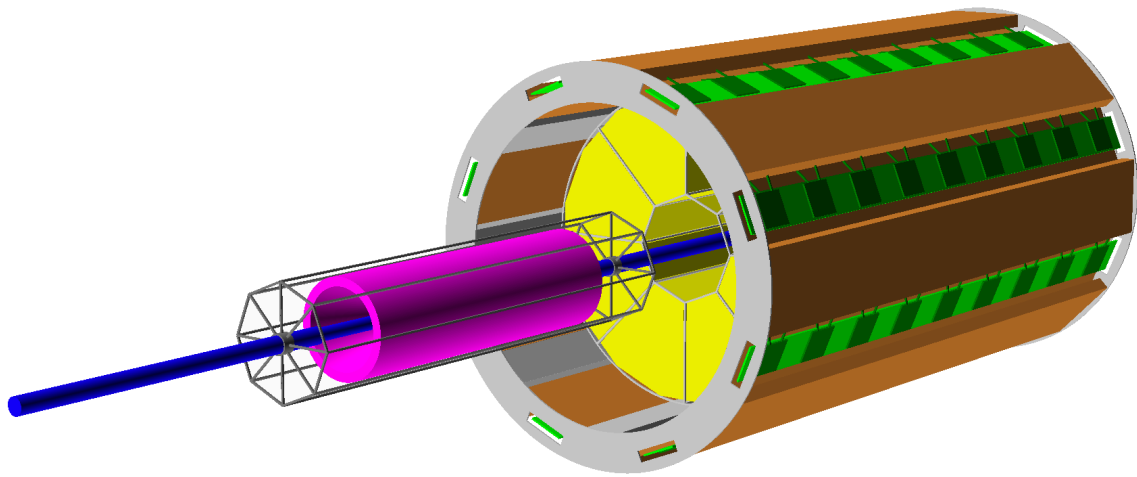


Рис. 19: The cage with VD and beampipe slides into its central position inside the ST frame.

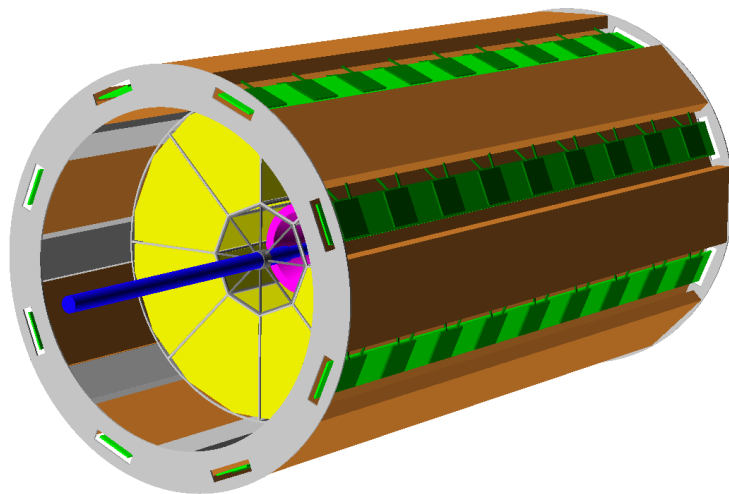


Рис. 20: Final configuration with VD installed in the ST cage.

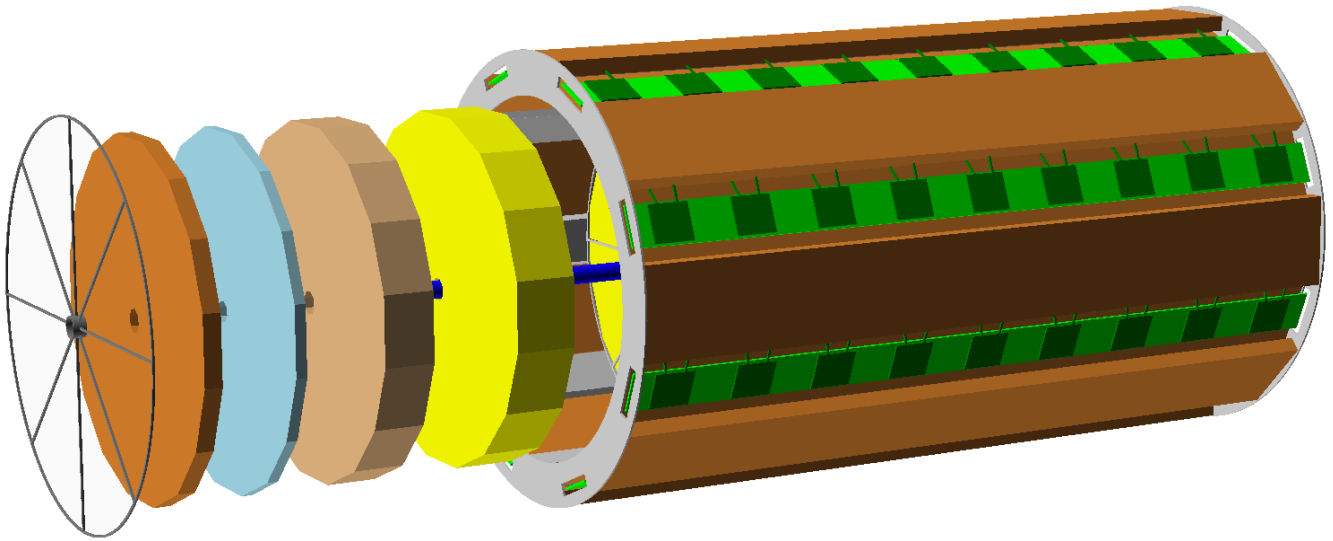


Рис. 21: The endcaps of ST, Aerogel, BBC and TOF are mounted one-by-one by moving them along the beampipe. The last object in this sequence is a clamp that holds the pipe. All endcaps and the clamp are braced to the TOF barrel frame.

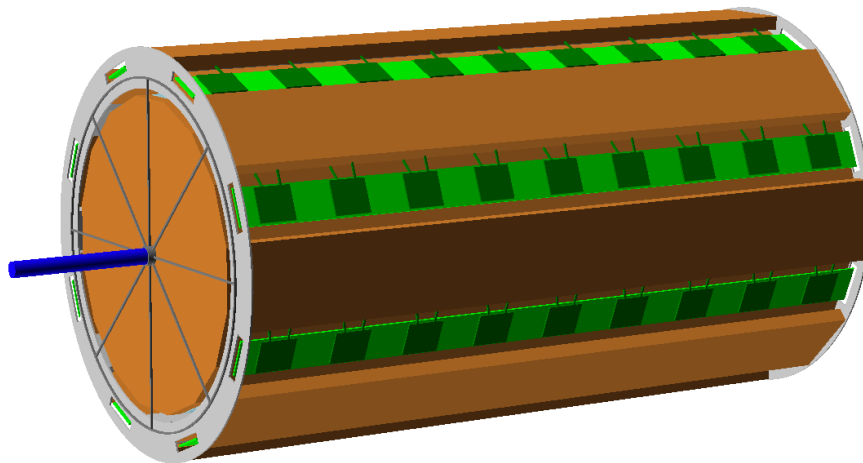


Рис. 22: The assembly of ST, Aerogel, BBC, TOF and VD in its final configuration. The assembly procedure can be carried out either directly in the experimental hall, or somewhere in the assembly room outside the experimental area. The latter case has an advantage in view of the fact that during the operation of the accelerator, access to the experimental area will be restricted.

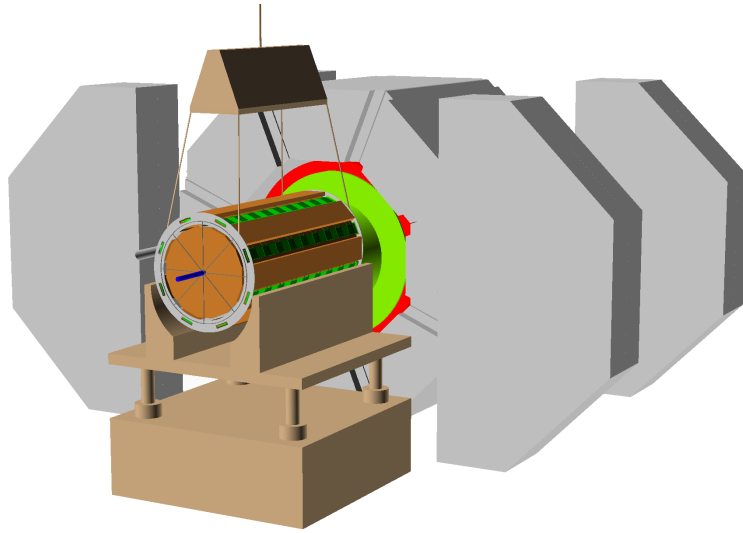


Рис. 23: The TOF barrel with other inner detectors (ST, Aerogel, BBC, and VD) is lowered by a crane into the cradle. The lifting platform of the cradle can be the same as for the magnet (see Fig. 3) but the vise mechanism to be adjusted to the new size.

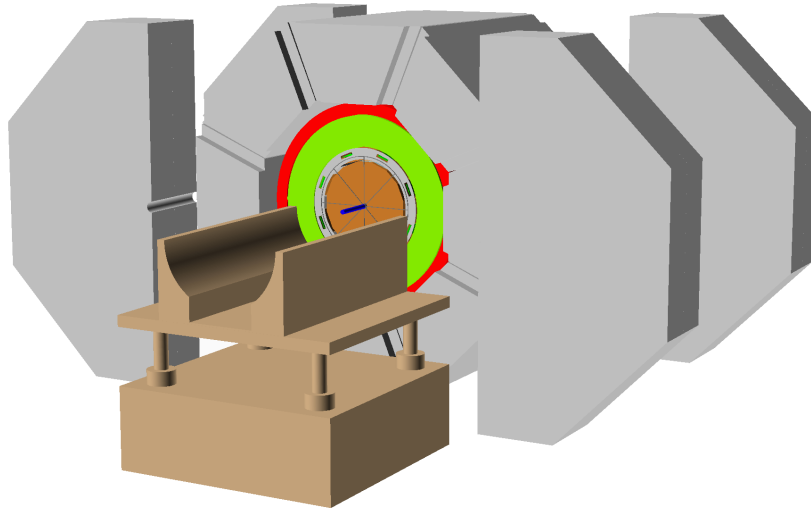


Рис. 24: The TOF barrel with other inner detectors is moved along the rails to the working position.

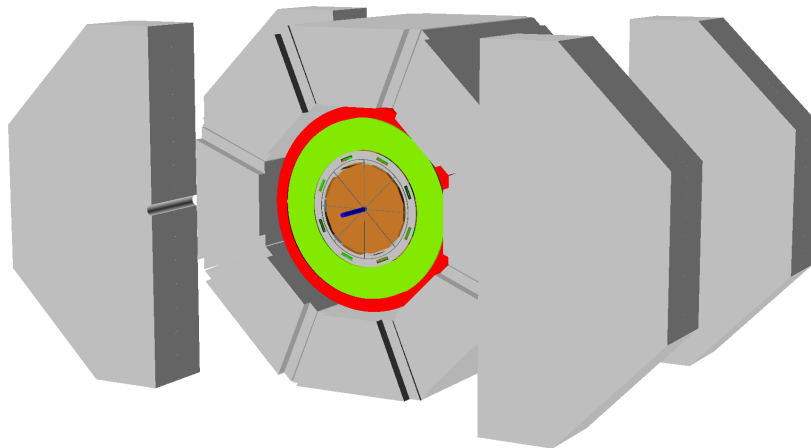


Рис. 25: Final configuration with the TOF barrel with other inner detectors installed.

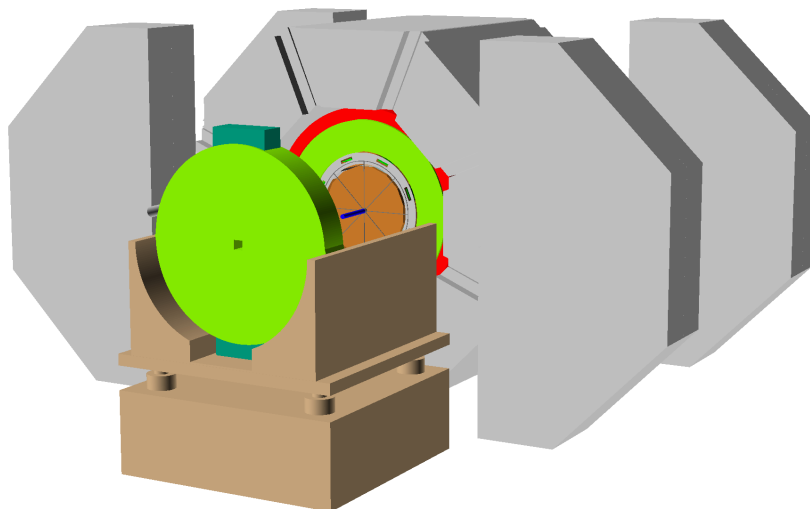


Рис. 26: The ECal endcap is lowered by a crane into the the same cradle. Assuming the same transversal dimation of the ECal endcap as for the ECal barrel, the same configuration of the cradle can be used as for the ECal barrel.

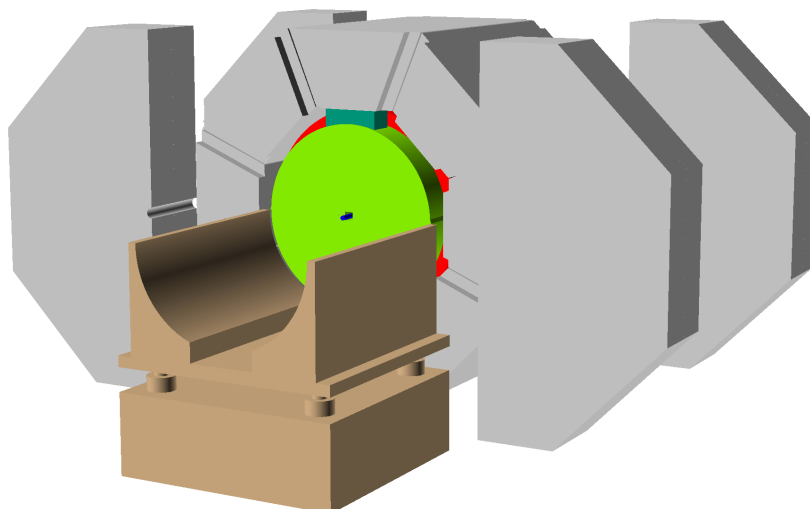


Рис. 27: The ECal endcap is moved along the rails to the working position and fixed to RS.

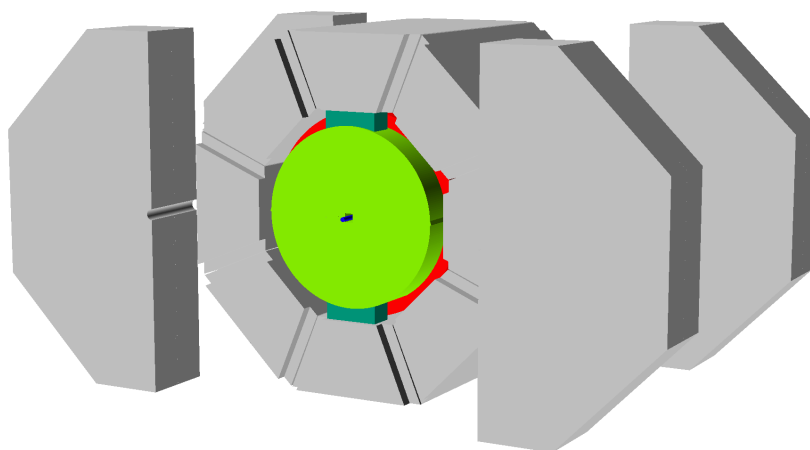


Рис. 28: Final configuration with the ECal endcap installed.

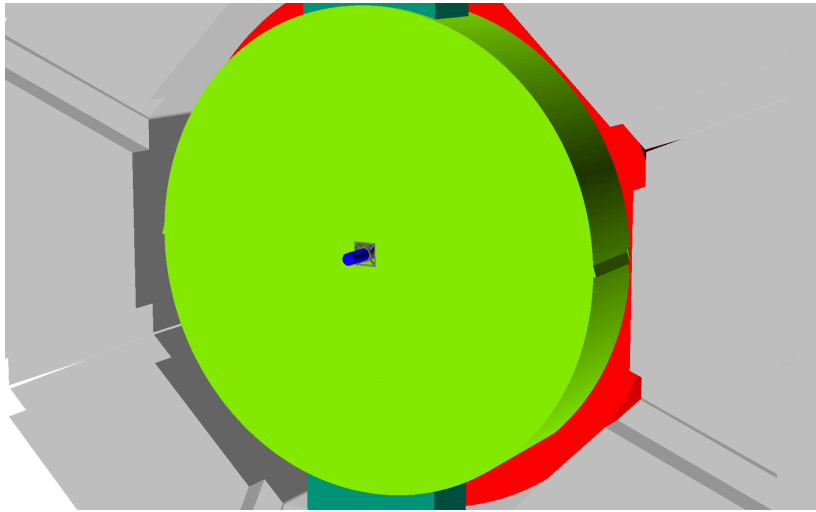


Рис. 29: Mounting the clamp that holds the beampipe in the middle of the central hole of the ECal endcap. The clamp is fixed to the edges of the hole.

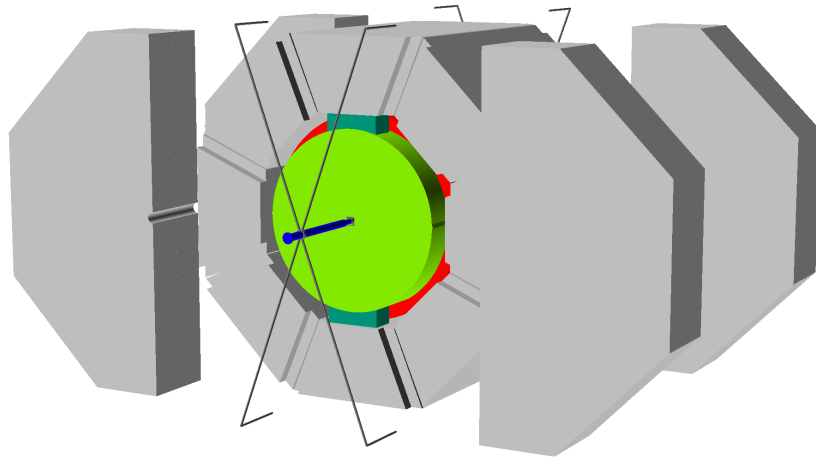


Рис. 30: The edge section is bolted to the beampipe at one end. At the outer end, the section is held by four rods, which, in turn, are attached to the lower and upper parts of the support frame.

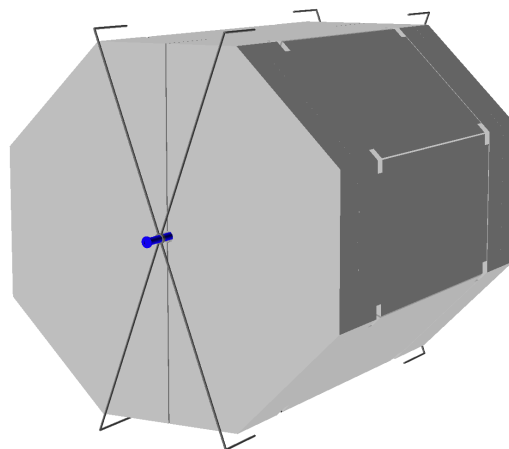


Рис. 31: Two sections of the RS endcap are closed. The setup is ready to be transported to the beam position.