**BEAM PIPE**

The proton beams circulate in the accelerator in Ultra High Vacuum to make them interact only with each other when colliding at the interaction point. A special beam pipe "holds" the vacuum where they pass through the LHCb detector: it has to be mechanically very strong to stand the difference in pressure between the vacuum inside it and the air in the cavern but also be as transparent as possible for the particles originating in the proton-proton collisions.

The LHCb beam pipe is made of four conical sections from 2 to 6 m in lengths ending with flanges to mount them together.

The first Beryllium section: “25 mrad”

All sections after metrological checks are put through vacuum tests.

The second Beryllium section

Two compensator sections with bellow allow adjustments between sections. Thermal expansion during "Bake−Out" and the small movement of the VELO window when pumped down to vacuum.

The Exit Window connecting to the VELO vacuum vessel

Special Al bellows have been machined at CERN.

The beam pipe in its shipping cradle

Two compensator sections with bellow allows adjustments between sections. Thermal expansion during "Bake−Out" and the small movement of the VELO window when pumped down to vacuum.

The LECS beam pipe is made of a first conical section with angular aperture of 25 mrad in the RICH1 area followed by a series of cones of 10 mrad welded together to the end of the muon system following the inner aperture of the detector.

Less particles cross the walls of a beam pipe in the shape of a cone rather than a cylinder.

The LHCb detector: it has to be mechanically very strong to stand the difference in pressure between the vacuum inside it and the air in the cavern but also be as transparent as possible for the particles originating in the proton-proton collisions.