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# IRIS vertex, how to get closer to the interaction point

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Positioning the first sensor layer as close as possible to the interaction point represents one of the major requirements for future generation vertex detectors. In view of the ALICE upgrade for LHC RUN5, a futuristic concept of a vertex detector inserted inside the beampipe has been proposed. The vertex is constituted by four different modules, called petals. Three layers of sensors are housed inside each petal in a secondary vacuum environment. The petals can open and close, like in an iris optics diaphragm such to leave a clear passage to the beam during injection. At stable beam in the close configuration, they leave a minimum passage for the beam and place the first layer at 5mm from the interaction point. The petal walls, which separate the detector from the primary LHC vacuum, are the dominant contribution to the material budget and their thickness must be minimized. The wall of the petals oriented towards the beam acts as a radio-frequency (RF) foil, that controls the electromagnetic fields induced by the beam. Since this is equally relevant for the open and close positions, the petal geometries are designed to achieve an almost closed round bore when opened or closed, respectively. Detailed studies to verify that the design fulfill the beam requirements in term of aperture, impedance and vacuum stability have started. A further critical challenge is to develop the mechanics and vacuum equipment to preserve the possibility of access for maintenance.

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