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## Validation of the crab cavities internal monitoring strategy

The High Luminosity LHC (HL-LHC) project aims at upgrading the long straight sections of the LHC on each side of the two main LHC experiments, ATLAS and CMS. One of the innovative key technology is the superconducting cavities for beam rotation. These “crab cavities” are working in vacuum and cryogenic environment under radiation conditions. An alignment of the inner tank of the crab cavities to 0.5 mm at  $3\sigma$  is needed. A continuous monitoring system is also requested during the cool-down and the operation of the crab cavities in order to follow the movement of the inner tank with respect to the outer part of the cavities.

Two alignment systems have been tested on a prototype to provide the position monitoring: the BCAM system (Brandeis CCD Angle Monitor) which is based on optical elements, and the FSI (Frequency Scanning Interferometry) which is an absolute distance measurement device. The two systems have been compared without vacuum and without cryogenic environment in order to validate their accuracy. In parallel, they are validated regarding radiation and cryogenic aspects.

The results of the two types of measurement are compared and referenced to Laser Tracker measurement.

### Summary

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