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## **GIF++: A new CERN Irradiation Facility to test large-area particle detectors for the High-Luminosity LHC program (15' + 5')**

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The high-luminosity LHC (HL-LHC) upgrade is setting a new challenge for particle detector technologies. The increase in luminosity will produce a higher particle background with respect to present conditions. Detector performance and stability at LHC and future system upgrades will remain the subject of extensive studies.

The present contribution describes the new Gamma Irradiation Facility (GIF++) recently built at CERN. GIF++ is a unique place where high energy charged particle beams (mainly muon beam with momentum up to 100 GeV/c) and gammas from a 14 TBq  $^{137}\text{Cesium}$  source are simultaneously available. The high activity of the source produces a background gamma field allowing to accumulate doses equivalent to HL-LHC experimental conditions in a reasonable time (typically few months for muon detectors). The 100 m<sup>2</sup> GIF++ irradiation bunker has two independent irradiation zones making possible to test real size detectors (several m<sup>2</sup>), as well as a broad range of smaller prototype detectors and electronic components. The photon flux of each irradiation zone can be tuned using a set of Lead filters with attenuation factors from zero to 50000.

Flexible services and infrastructure including electronic racks, gas systems, radiation and environmental monitoring systems and a large preparation zone allow time-effective installation of detectors. A dedicated control system provides the overview of the status of the facility and archives relevant information.

The new facility is operational since April 2015 with an active user community of about 90 physicists, engineers and technicians. About 15 setups are constantly performing R&D tests in the bunker. They include seven different gaseous detector technologies: Drift Tubes, Gas Electron Multiplier, Cathode Strip Chambers, Micro-Megas, Resistive Plate Chambers, glass based Resistive Plate Chambers and Thin Gap Chambers. In addition, the facility permits to perform validation tests for the final production chambers just before installation in the LHC experiments. The varieties of tests performed will be presented.

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