THE FAST INTERACTION TRIGGER FOR ALICE UPGRADE

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The LHC is scheduled for the upgrade during the Long Shutdown 2 in 2019-2020. All the LHC experiments have to modernize their hardware to cope with increased luminosity and trigger rate afterwards. ALICE will implement a new Fast Interaction Trigger (FIT) in place of current T0, V0 and FMD detectors to generate fast triggers and determine multiplicity, centrality and event plane in these new conditions.

FIT will consist of two Cherenkov arrays and a segmented scintillator ring. The arrays will surround the beam pipe on both sides of the interaction point (IP): 800 mm from IP on the hadron absorber side and 3200 mm on the opposite side. Due to limited space on the absorber side the scintillator ring will be placed only on the opposite side.

The two arrays (T0+) will be composed of detector modules featuring quartz radiators optically coupled to MCP-PMT optical sensor. Although slower than Cherenkov arrays, the scintillator ring (V0+) will greatly increase the acceptance of FIT, which will lead to better overall performance.

FIT is currently undergoing an intense R&D effort. It has to be ready for installation in 2019. The first prototype of the FIT T0+ module has been collecting data during 2016. It is installed inside of the ALICE setup, just below the current T0 detector. In parallel, the ongoing Monte Carlo simulations verify the physics performance of FIT and the detailed design of mechanical supports and integration plans are being made. This talk will give a short description of FIT and present the results from FIT prototype module installed in ALICE in light of detector performance goals to be achieved.
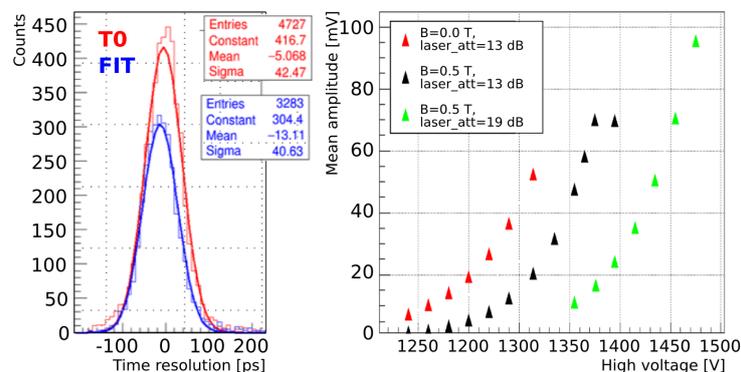

Figure 1: The first results obtained with FIT T0+ module using LHC beam. Left: single MIP time resolution of T0+ (40 ps) in comparison with T0 (42 ps). Right: MCP gain vs. HV bias with and without field in the L3 magnet.