Contribution ID: **92** Type: **Presentation**

ALICE Fast Interaction Trigger detector for the future

Monday, 23 June 2014 18:50 (20 minutes)

As a result of the LHC upgrade after the Long Shutdown 2, the expected luminosity and collision rate during the so called Run 3 will considerably exceed the design parameters for several of the key ALICE detectors systems including the forward trigger detectors. Furthermore, the introduction of a new Muon Forward Tracker significantly reduces the space envelope available for the upgraded Fast Interaction Trigger (FIT) detector on the muon spectrometer side. At the same time, FIT is expected to match and even exceed the functionality and performance currently secured by three ALICE sub-detectors: the time zero detector (T0), the VZERO system, and the Forward Multiplicity Detector (FMD). The harsh conditions of Run 3 would accelerate the ageing and radiation damage (detectable already during Run 1) of the FIT detector if we were to use standard PMTs. The solution came thanks to the latest developments in MCP-PMT technology providing compact photo sensors with excellent characteristics and stability. The key design features of FIT will be presented together with the latest simulation results and benchmark tests of the prototype.

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Session Classification: Physical possibilities of future colliders and other facilities