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A light collection upgrade proposal for the FDD

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Content

Run 3 at the LHC is scheduled to start in 2021, prior to this stage, the ALICE experiment is being upgraded in preparation for the High Luminosity upgrade program (HL – LHC) that the LHC will undergo, which will impose very stringent constraints in terms of radiation resistance to detector systems. Due to these constraints a detector design is proposed with the purpose of optimizing light collection for the forward diffraction detector (FDD) detector at the ALICE experiment in the LHC while keeping its photo-detectors at a safe distance from the interaction point (IP) in order to minimize the radiation impact on their performance. The proposed solution is the use of a compound parabolic concentrator (CPC) – type light collector coupled to a scintillator plastic to focus the light yielded into an optical fiber array. Here we report the design process of such system, the simulation results, its manufacturing process, the experimental results, and finally we proceed to make a comparison of the FDD system performance with and without the proposed light collector.

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