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Improvement of the EUDET Telescope Timing Performance

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Stringent requirements are posed on the next generations of vertex and tracking detectors for high-energy physics experiments to reach the foreseen physics goals. Hence, a large variety of silicon sensors targeting the specific needs of each use case are developed and tested both in laboratory and test-beam measurement campaigns. An increasing number of these detectors provides hit time information with high precision. The EUDET telescopes serve as high performance reference telescopes for many years with an excellent spatial resolution. In this contribution, recent results are presented showing that the reference track time resolution of the telescope can be improved from $O(10\text{ns})$ to below 1ns by making full use of the information stored in the data of the AIDA TLU with an upgraded firmware version. In addition, a Timepix3 reference plane with a time resolution of 1.1ns was added to one of the telescope setups to resolve ambiguities for the track timestamp for larger occupancies. The analysis was performed using the Corryvreckan framework and an example is shown how to achieve the presented improvements.

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