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Improved charged particle timing measurements with Timepix3 ASIC

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A possible solution to cope with the increased pile-up achieved at the HL-LHC and beyond is the 4D tracking, using time measurements in addition to space.
New sensor technologies are being explored to achieve the time resolution required for this new approach.

In this presentation we show the most recent results obtained with devices under test studied with tracks reconstructed by the LHCb VELO Timepix3 Telescope. The telescope has fine time stamping thanks to the combination of several Timepix3 planes and scintillators, enabling resolution studies of the order of 100 ps.
Our initial analysis points to best results around 590 ps resolution, where a 450 ps contribution is expected from the Timepix3 1560 TDC bin size.
The newest results obtained with the particle beam at the SPS will be presented comparing a few different sensor prototypes including a typical planar geometry and 3D sensors.

TIPP2020 abstract resubmission?

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