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Track Reconstruction in the Pixel Detector for CMS High-Level Trigger using GPUs

The pixel detector in the CMS experiment has been upgraded with additional 4th barrel layer and 3rd forward disk while maintaining same pixel dimension (150 x 100 μm2). Due to large volume of data from pixel detector, the processing power of the HLT CPUs is not sufficient to reconstruct tracks from all events. However, many trigger paths would benefit from pixel tracks to increase their efficiency and/or reduce their rate. In order to reconstruct tracks within the specified latency, it is imperative to process data using parallel computing techniques. We are developing algorithms to reconstruct tracks starting from raw pixel detector data for each event using GPUs. They provide large number of processing threads for performing similar tasks to be carried out for all the modules of the detector simultaneously. Initial assessment shows significant improvement in the timing performance of GPU when compared with the CPU. Results and future plans on these developments will be presented

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