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## Line Segment Tracking in the HL-LHC

*Tuesday, 31 May 2022 14:30 (25 minutes)*

The major challenge posed by the high instantaneous luminosity in the High Luminosity LHC (HL-LHC) motivates efficient and fast reconstruction of charged particle tracks in a high pile-up environment. While there have been efforts to use modern techniques like vectorization to improve the existing classic Kalman Filter based reconstruction algorithms, we take a fundamentally different approach by doing a bottom-up reconstruction of tracks. Our algorithm, called Line Segment Tracking, constructs small track stubs from adjoining detector regions, and then successively links these track stubs that are consistent with typical track trajectories. Since the production of these track stubs is localized, they can be made in parallel, which lends way into using architectures like GPUs and multi-CPU's to take advantage of the parallelism. We establish an implementation of our algorithm in the context of the CMS Phase-2 Tracker which runs on NVIDIA Tesla V100 GPUs, and measure the physics performance and the computing time.

### Consider for young scientist forum (Student or postdoc speaker)

Yes

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