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The Parallel Cellular Automaton track finder for the CBM experiment

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The CBM experiment at FAIR is being designed to study heavy-ion collisions at extremely high interaction rates. The event selection has to be done online and requires full event topology reconstruction, therefore fast and efficient reconstruction algorithms are needed.

The Cellular Automaton track finder is fast and robust and thereby will be used for the online and offline track reconstruction. In order to fully utilise the processing power provided by modern computer architectures parallelism is to be implemented for the reconstruction.

The CA track finder was fully parallelised inside the event. Since the CBM beam will have no bunch structure, but continuous, the reconstruction of time slices rather than events is needed. Thus, the parallel version of the algorithm was optimised for reconstruction of groups of minimum bias events packed in slices.

The parallel version of the algorithm shows the same efficiency as a single core one and achieves a speed up of about 10 while parallelising between 10 Intel Xeon physical cores with a hyper-threading.

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