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On-line Event reconstruction in the CBM experiment (CBM)

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The CBM experiment is an experiment being prepared to operate at the future FAIR facility. Its main focus is the measurement of very rare probes, which requires interaction rates of up to 10 MHz. Together with the high multiplicity of charged tracks produced in heavy-ion collisions, this leads to huge data rates of up to 1 TB/s. Most trigger signatures are complex (short-lived particles, e.g. open charm decays) and require information from several detector sub-systems. First Level Event Selection (FLES) in the CBM experiment will be performed on-line on a dedicated processor farm. This requires the development of fast and precise reconstruction algorithms suitable for on-line data processing. The algorithms have to be intrinsically local and parallel and thus require a fundamental redesign of traditional approaches to event data processing in order to use the full potential of modern many-core CPU/Phi/GPU architectures. Thus, algorithms of the package are based on the Cellular Automaton and Kalman filter methods and implemented in single precision and massively parallelized.

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