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The ATLAS fast chain MC production project

During the last years ATLAS has successfully deployed a new integrated simulation framework (ISF) which allows a flexible mixture of full and fast detector simulation techniques within the processing of one event. With the ISF, the simulation execution speed could be increased up to a factor 100, which makes subsequent digitisation and reconstruction processing the dominant contributions to the MC production CPU cost. The slowest components of both digitisation and reconstruction are within the Inner Detector due to the complex signal modelling needed in the emulation of the detector readout and in reconstruction due to the combinatorial nature of the problem to solve, respectively. Alternative fast approaches have been developed for these components: for the silicon based detectors a simpler geometrical clustering approach has been deployed replacing the charge drift emulation in the standard digitisation modules, and achieves a very high accuracy in describing the standard output. For the Inner Detector track reconstruction, a Monte Carlo truth based trajectory building has been deployed for bypassing the CPU intensive pattern recognition. All components have been, together with the ISF, integrated into a new fast MC production chain, aiming to produce fast MC simulated data with acceptable agreement with fully simulated and reconstructed data at a processing time of seconds per event.

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