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## Perspectives of the new GPU Computing technology in the HEP

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Currently, technological solutions being adopted by more manufacturers are bringing to CPU architecture with an even more degree of parallelism, evolving from the multi-core era to the "many-core" era. In this scenario hundreds and, in short, thousands of processing cores, are contained within the same processor. A so deep change in architectural paradigm compels an equally deep change in algorithms and programming paradigms. In this context, the GPU (Graphics Processing Unit) were created to accelerate typical 2D and 3D graphic processing, characterized by an extreme degree of parallelism, containing hundreds of processing cores. Due to their characteristics, these are now used to perform complex calculations also in more general fields. During the talk an introduction to GPU Computing will be presented, providing a small technological outlook on manycore scenarios and a brief introduction on architectures such as CUDA and OpenCL. As first test case we report performance information obtained with GPU algorithms developed in Perugia in the context of the European project Einstein Telescope (ET) and the INFN project MaCGO (Manycore Computing for Future Gravitational Observatories). Then we report about other algorithms such as Monte Carlo methods, Random Number Generation, particle simulation and some other typical algorithms used in Numerical Physics.

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