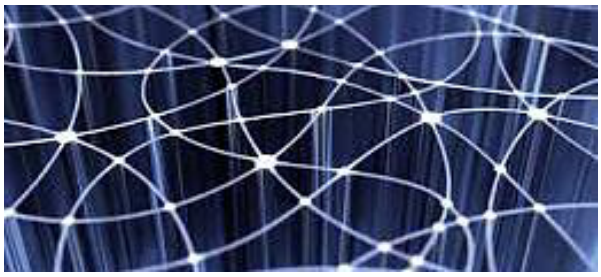

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ATLAS GPU Trigger Studies

The ATLAS trigger system is required to filter collisions in the detector and reduce the millions of collisions per second down to a few hundred events
which are stored and analysed further. The trigger system is split into a number of subsystems which run at different levels of abstraction. The High Level
Trigger is required to decode the bytestream from the detector into space points and run clustering algorithms on these results. This must be done
efficiently and quickly. This problem lends itself well to a parallel processing solution as all of the data points are independent. NVIDIA Tesla GPUs with thousands of cores, multi-co\
re processors
and co-processors, such as the Intel Xeon Phi, have been investigated as possible tools to enhance the ATLAS High Level Trigger. This allows for the main CPU to distribute
large, computationally intensive problems to the GPUs, or co-processors. ARM processors are being investigated for high throughput computing with low energy consumption, however, they
have limited processing power. Many of the latest ARM/ mobile processors have built in GPUs which offer substantial computing power. This would allow for
a similar construct that is used in the ATLAS High Level Trigger GPU study. The OpenCL programming langauge allows for multi-core code to be ported between
devices fairly easily, which would allow for benchmarks to be run to compare the performance of the ARM processors with the built in GPUs with the larger, more powerful NVIDIA GPUs.

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