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Monte Carlo Simulations of the IceCube Detector with GPUs

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The IceCube Neutrino Observatory is a cubic kilometer-scale neutrino detector built into the ice sheet at the geographic South Pole. Light propagation in glacial ice is an important component of IceCube detector simulation that requires a large number of embarrassingly parallel calculations. The IceCube collaboration recently began using GPUs in order to simulate direct propagation of Cherenkov photons in the antarctic ice as part of our detector simulation. GPU computing is now being utilized in large scale Monte Carlo productions involving computing centers distributed across the world. We discuss practical issues of our implementation involving mixed CPU and GPU resources in the simulation chain and our efforts to optimize the utilization of these resources in a grid environment.

Summary

Primary authors: KOPPER, Claudio; SCHULTZ, David (University of Wisconsin-Madison); Dr CHIRKIN, Dmitry (University of Wisconsin-Madison); DIAZ VELEZ, Juan Carlos (University of Wisconsin-Madison)

Presenter: KOPPER, Claudio

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