

GPU Accelerated optical light propagation in CORSIKA8

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Optical photons, created from fluorescence or Cerenkov emission in atmospheric cascades induced through high energetic cosmic rays are of major interest for several experiments. Experiments like CTA require a significant amount of computing time and funds for the simulation with CORSIKA.

Since individual photons don't interact they can be simulated without any order as in the traditional sequential approach and on the contrary leads to reduced utilization of modern hardware infrastructure. The calculations on each photon have low complexity, compared to the other aspects of the simulation. This, as well as the fact that besides the photon itself nearly no additional data is needed, favors a data-parallel approach in which several photons are propagated. The new CORSIKA 8 framework enables the implementation and verification of these methods.

With the use of dedicated high parallel acceleration hardware like GPUs the possible benefits with this data-parallel approach are even higher. First results and comparisons based on different algorithms and precision levels are shown.

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Collaboration

CORSIKA-8

other Collaboration

Subcategory

Experimental Methods & Instrumentation

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