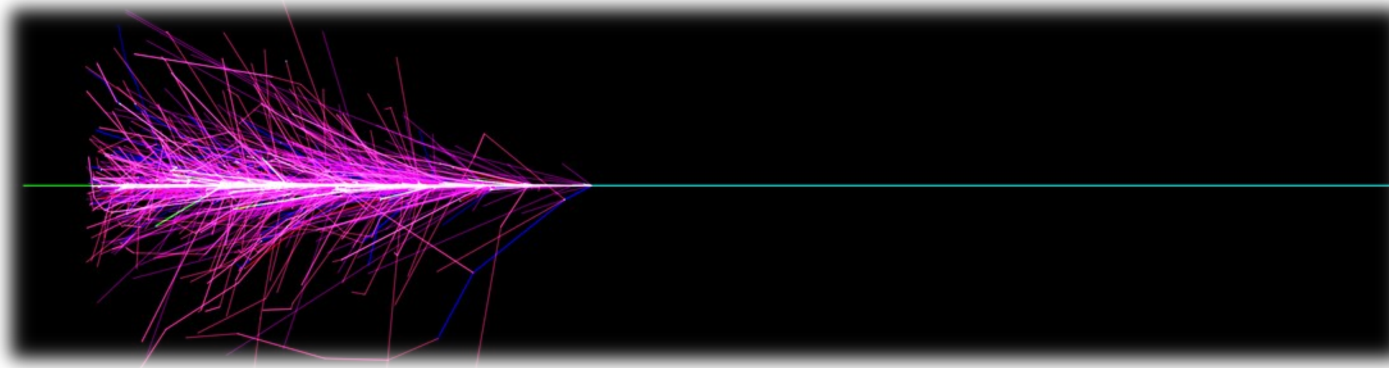
technische universität dortmund

SFB 876 Providing Information by Resource-Constrained Data Analysis

lehrstuhl physik e5

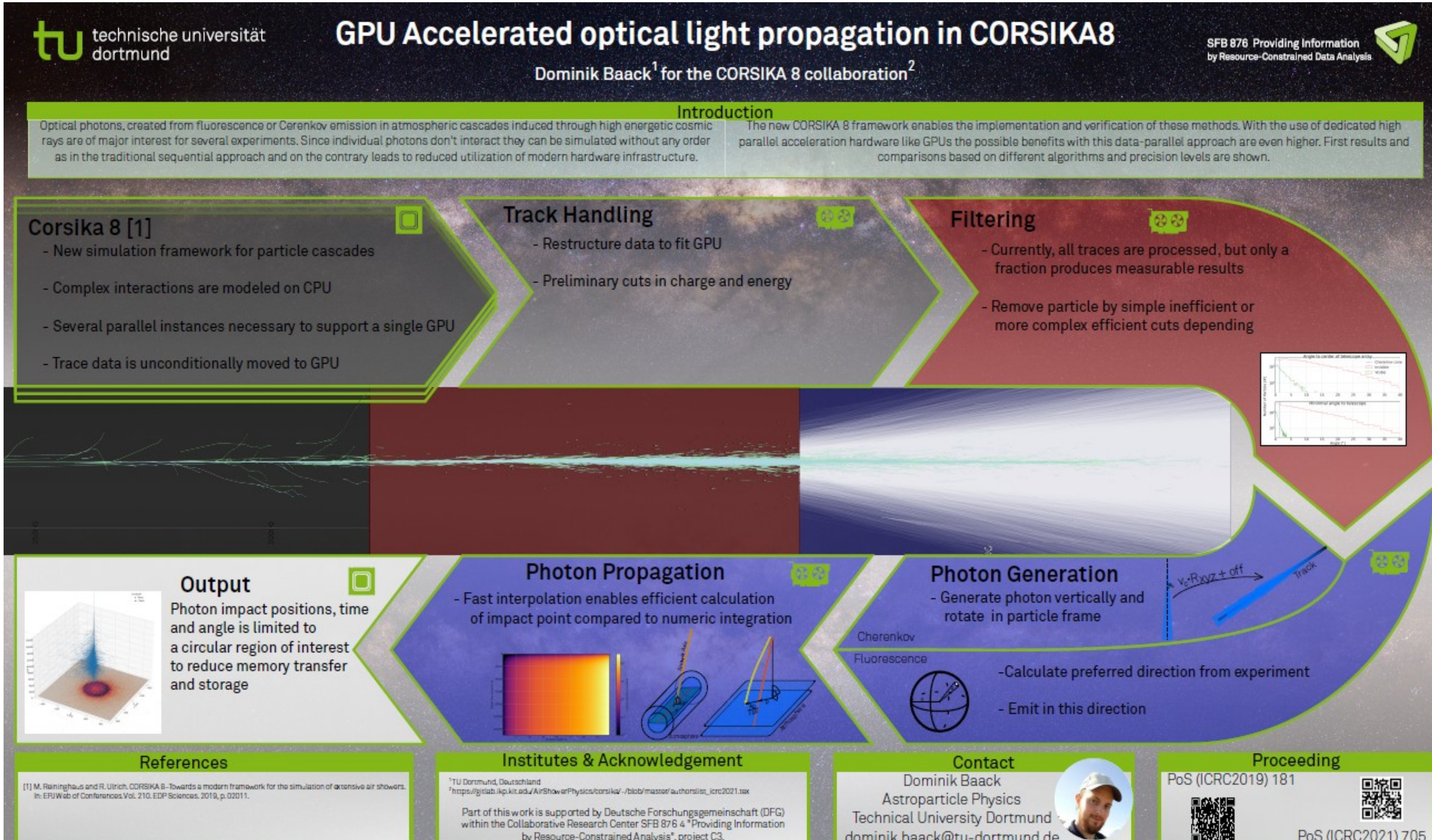


GPU Accelerated optical light propagation in CORSIKA8

Dominik Baack

ICRC2021

Online



Highly parallel CORSIKA processing

Corsika 8 [1]

- New simulation framework for particle cascades
- Complex interactions are modeled on CPU
- Several parallel instances necessary to support a single GPU
- Trace data is unconditionally moved to GPU

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Track Handling

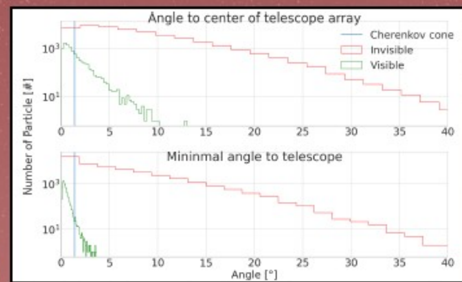
- Restructure data to fit GPU

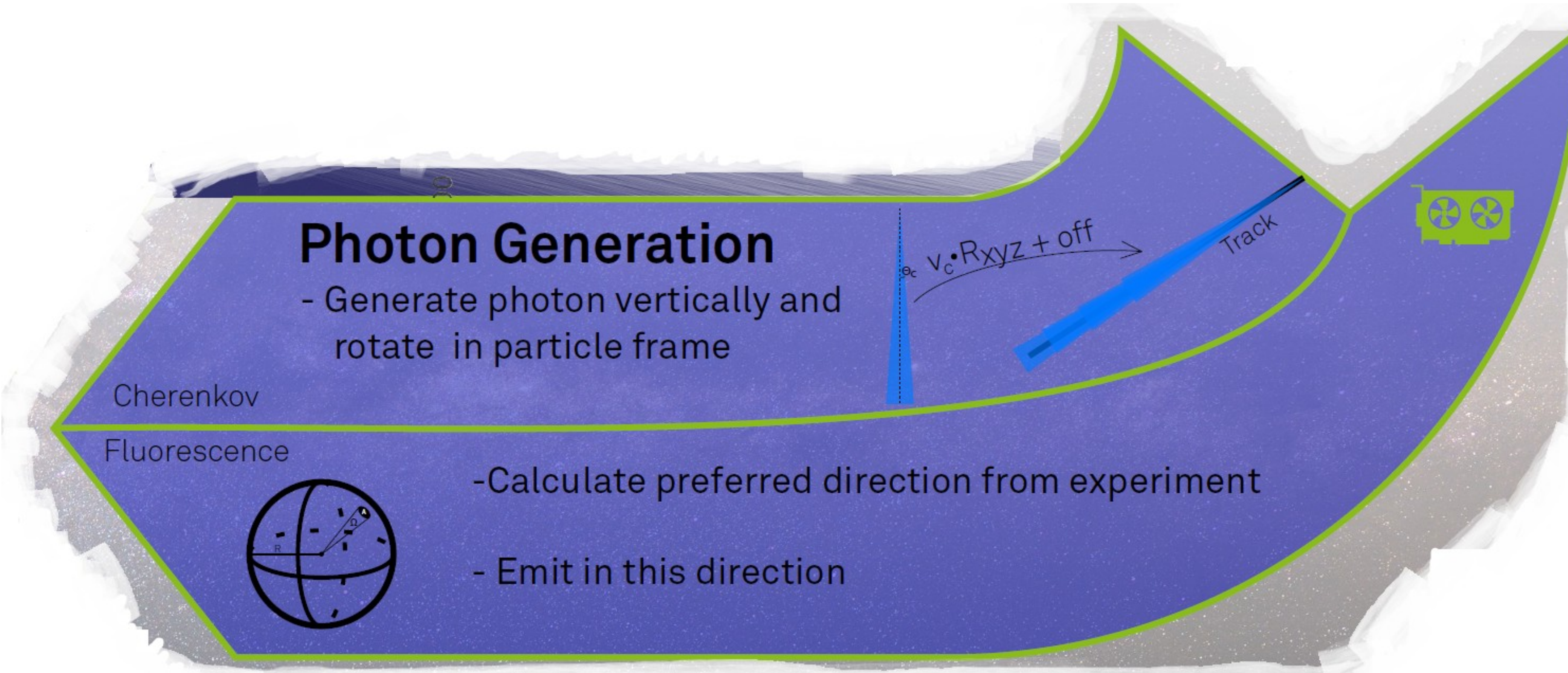
- Preliminary cuts in charge and energy

Filtering

- Currently, all traces are processed, but only a fraction produces measurable results

- Remove particle by simple inefficient or more complex efficient cuts depending





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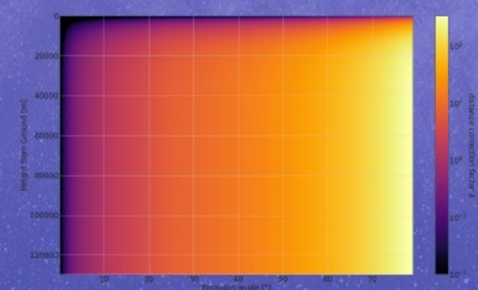
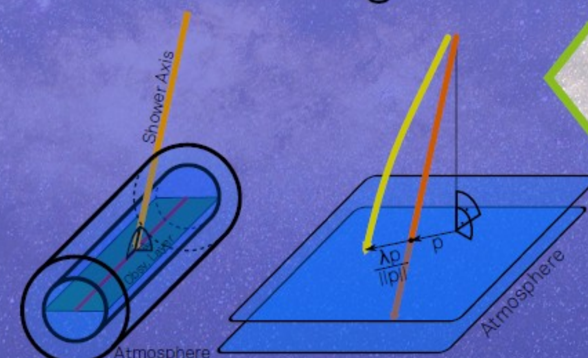
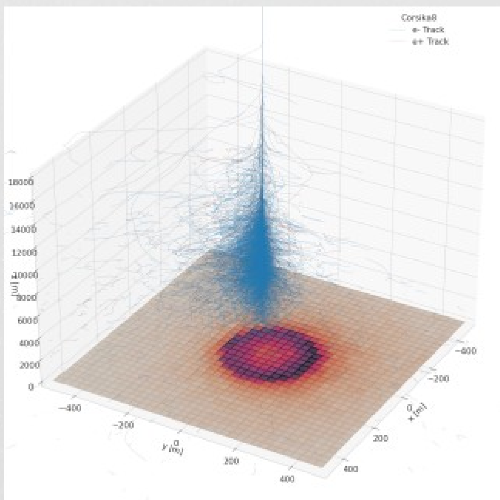
Photon Propagation

- Fast interpolation enables efficient calculation of impact point compared to numeric integration





Output



Photon impact positions, time and angle is limited to a circular region of interest to reduce memory transfer and storage

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