MATTER AND TECHNOLOGIES

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# Performance Portable High Data Rate Computing on Heterogeneous Hardware with Alpaka

Applications in areas such as data analysis, simulation or imaging are processing ever-increasing amounts of data.
Exploiting parallelism is a must to keep up with these demands.
However, one does not simply write a parallel and performance-portable code, that runs on various platforms like multi-core CPU of a laptop or thousands of GPUs on a Top10 compute cluster.

The Computational Radiation Physics group at HZDR is developing a modern software architecture, that provides various C++ zero-overhead abstraction components for accelerator programming and data communication.
Our open-source framework is currently being used in particle physics, fluid dynamics and image processing. These valuable coding experiences also help to find optimal component interfaces, as usability and template meta-programming are rather different worlds.

The poster presents the main modules including Alpaka [1] and gives an insight to the future work.

[1]
Alpaka - Abstraction Library for Parallel Kernel Acceleration
https://github.com/ComputationalRadiationPhysics/alpaka

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