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## tracc - GPU Track reconstruction demonstrator for HEP

*Tuesday, 31 May 2022 15:00 (25 minutes)*

In the future HEP experiments, there will be a significant increase in computing power required for track reconstruction due to the large data size. As track reconstruction is inherently parallelizable, heterogeneous computing with GPU hardware is expected to outperform the conventional CPUs. To achieve better maintainability and high quality of track reconstruction, a host-device compatible event data model and tracking geometry are necessary. However, such a flexible design can be challenging because many GPU APIs restrict the usage of modern C++ features and also have a complicated user interface. To overcome those issues, the ACTS community has launched several R&D projects: tracc as a GPU track reconstruction demonstrator, detray as a GPU geometry builder, and vecmem as a GPU memory management tool. The event data model of tracc is designed using the vecmem library, which provides an easy user interface to host and device memory allocation through C++ standard containers. For a realistic detector design, tracc utilizes the detray library which applies compile-time polymorphism in its detector description. A detray detector can be shared between the host and the device, as the detector subcomponents are serialized in a vecmem-based container. Within tracc, tracking algorithms including hit clusterization and seed finding have been ported to multiple GPU APIs. In this presentation, we highlight the recent progress in tracc and present benchmarking results of the tracking algorithms.

### Consider for young scientist forum (Student or postdoc speaker)

No

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