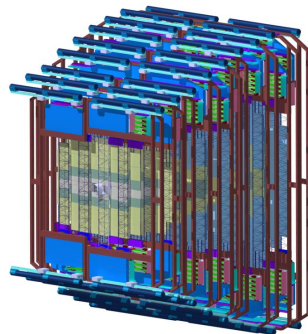


Optimizing the local reconstruction of the STS on GPU's

Kilian Hunold (FIAS)

April 1, 2022

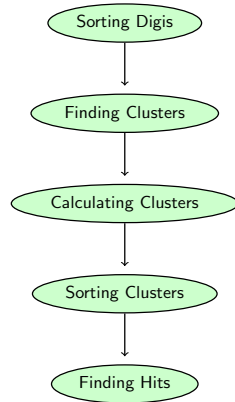
Local Reconstruction



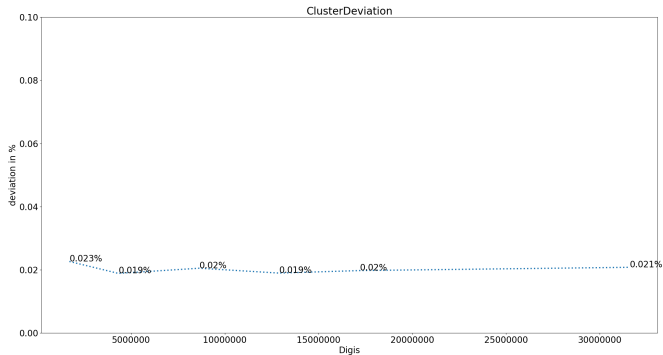
Source: The CBM Collaboration. "Technical Design Report for the CBM Silicon Tracking System (STS)"

Summary

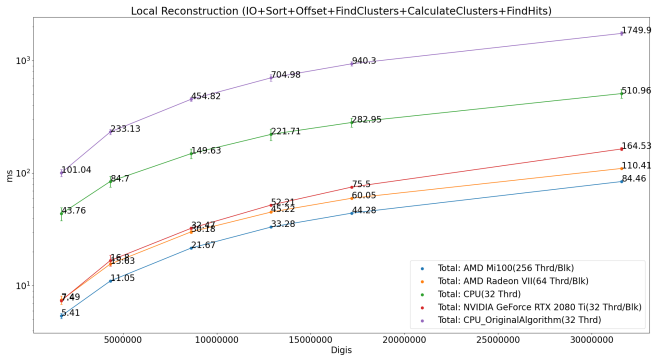
- Optimized Sorting
- Optimized Clusterfinder
- Optimized ClusterCalculation
- Optimized HitFinder
- Up to 21 times faster
- Number of clusters consistent at a level of $3e-4$
- Memory bandwidth limitates these Algorithms
- Repo: <https://github.com/fweig/CbmRootGPU>



ClusterDeviation (Number of Clusters): Results



ClusterProcessing: Results



References

- <https://moderngpu.github.io/merge.html>
- <http://www.theoretische-informatik.com/mergesort.php>
- Green, Oded, Saher Odeh, and Yitzhak Birk. "Merge path-A visually intuitive approach to parallel merging." arXiv preprint arXiv:1406.2628 (2014)
- The CBM Collaboration. "Technical Design Report for the CBM Silicon Tracking System (STS)"
- Volker Friese. "A cluster-finding algorithm for free-streaming data"