EFFICIENT PROCESSING OF ATLAS EVENTS ANALYSIS IN PLATFORMS WITH ACCELERATOR DEVICES

André Pereira
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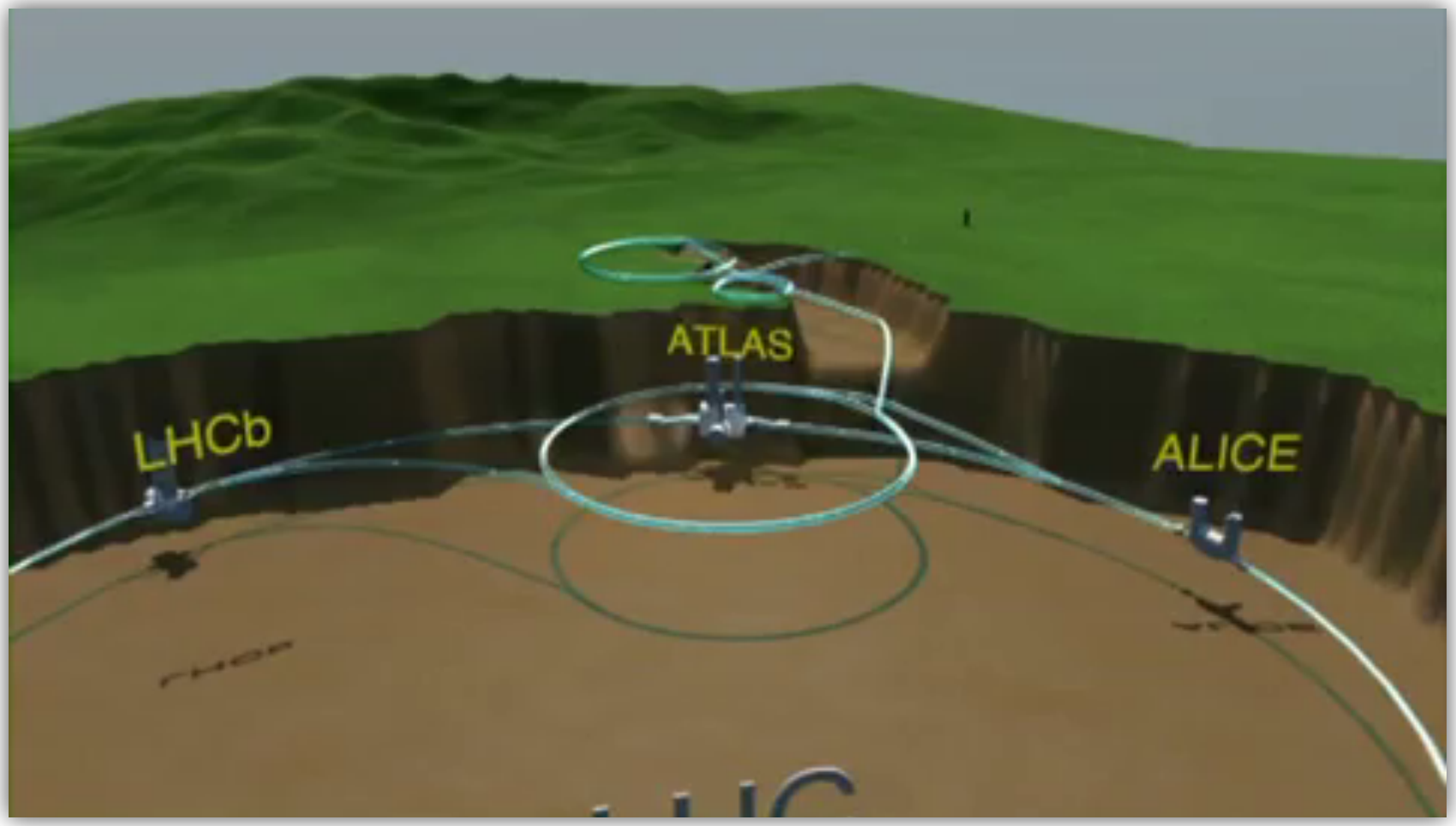
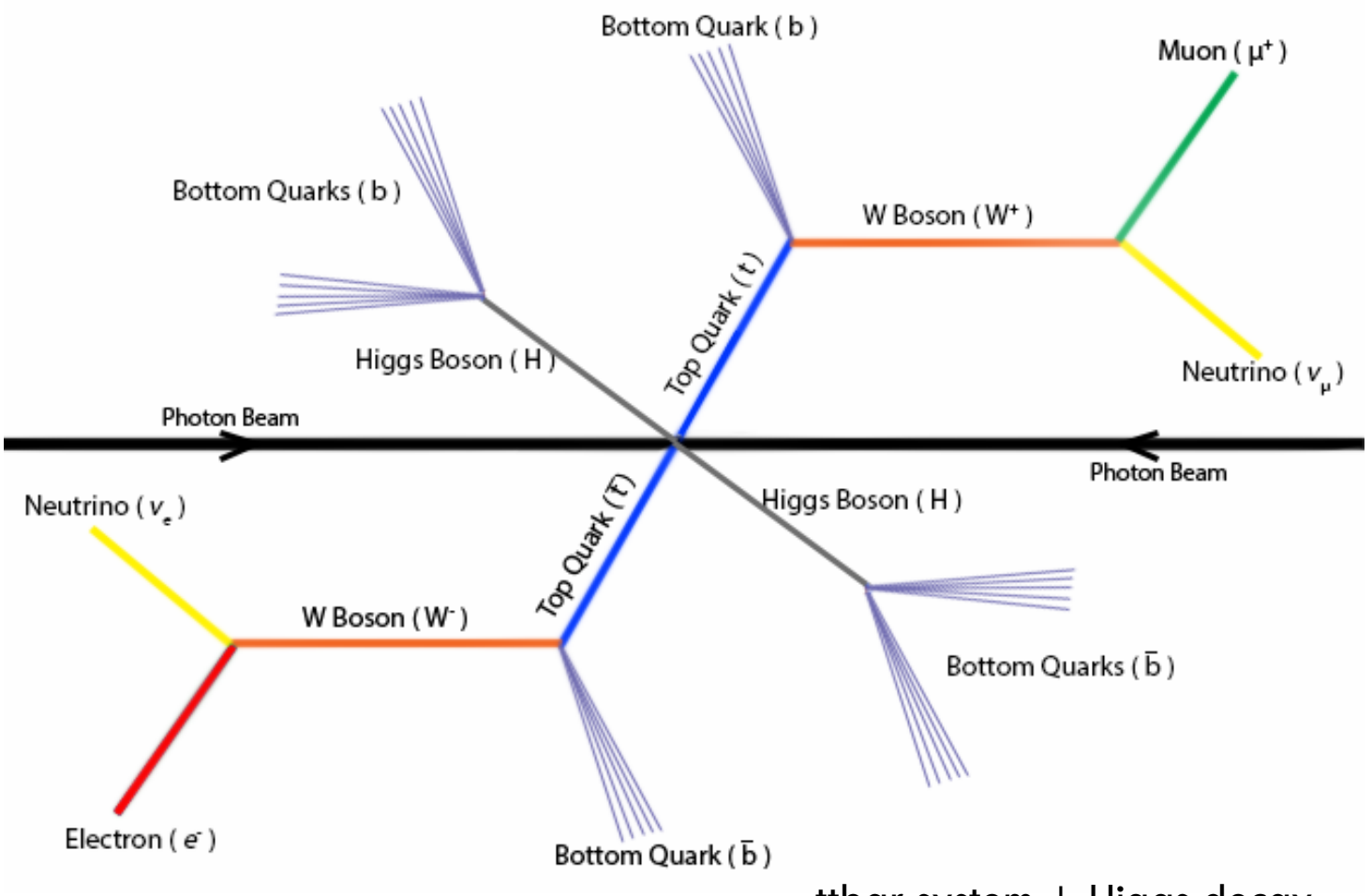
Motivation

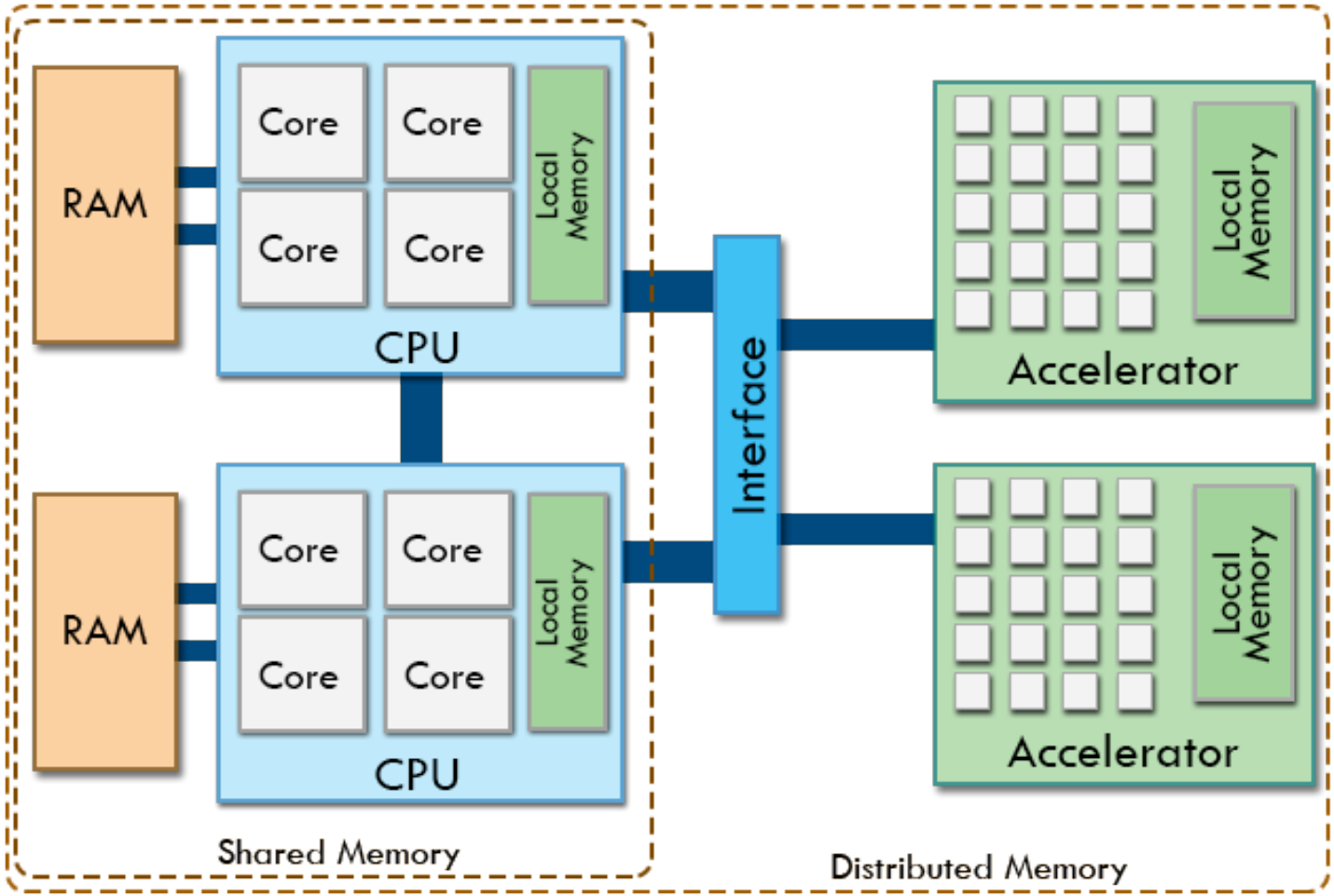


Motivation



ttbar system + Higgs decay

Heterogeneous Platforms



Heterogeneous Platforms

- Several challenges
  - Different architectures
  - Different programming paradigms
  - Load balancing
  - Debugging

Accelerator Devices

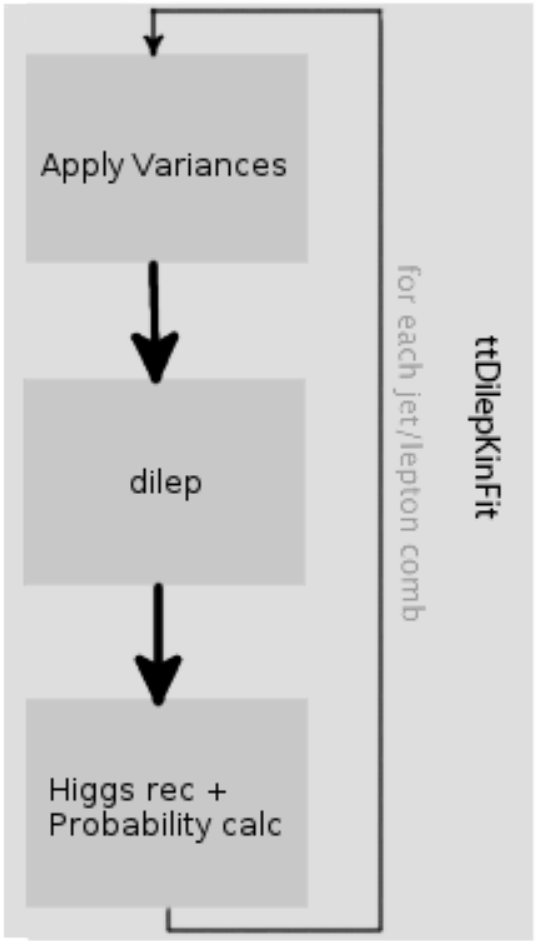
- Usually based on the SIMD model
- **G**raphics **P**rocessing **U**nits architectures
  - NVidia Fermi
  - NVidia Kepler
- Intel **M**any **I**ntegrated **C**ore architecture
  - Intel Xeon Phi

Development Frameworks

- Available frameworks
  - OpenMP (Homogeneous Platforms)
  - OpenACC (Heterogeneous Platforms)
  - GAMA (Heterogeneous Platforms only with GPUs)

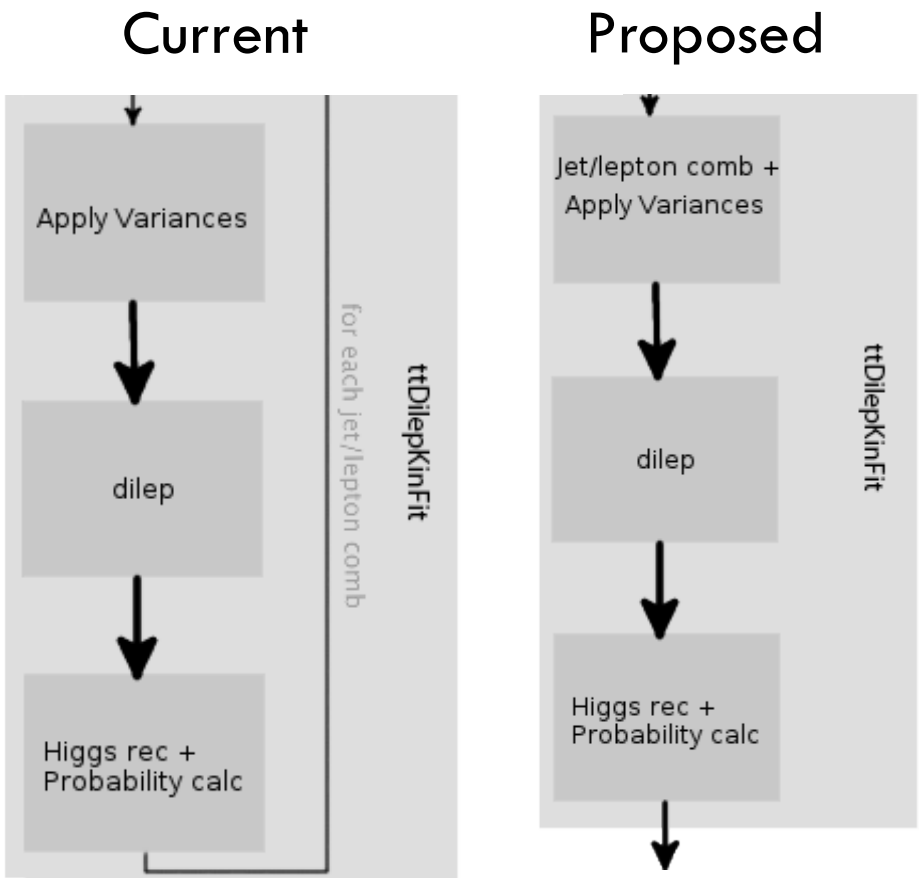
The ttH_dilep Analysis Application

- Series of filters applied to the events;
- Reconstruct the ttbar system and Higgs bosons;
  - Critical region: `ttDilepKinFit`



Future Work

- Refactor `ttDilepKinFit`



Future Work

- Parallelization on heterogeneous platforms
  - Comparing accelerator devices
- OpenACC vs GAMA

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