University of Minho
Department of Informatics

EFFICIENT PROCESSING OF ATLAS EVENTS ANALYSIS IN PLATFORMS WITH ACCELERATOR DEVICES

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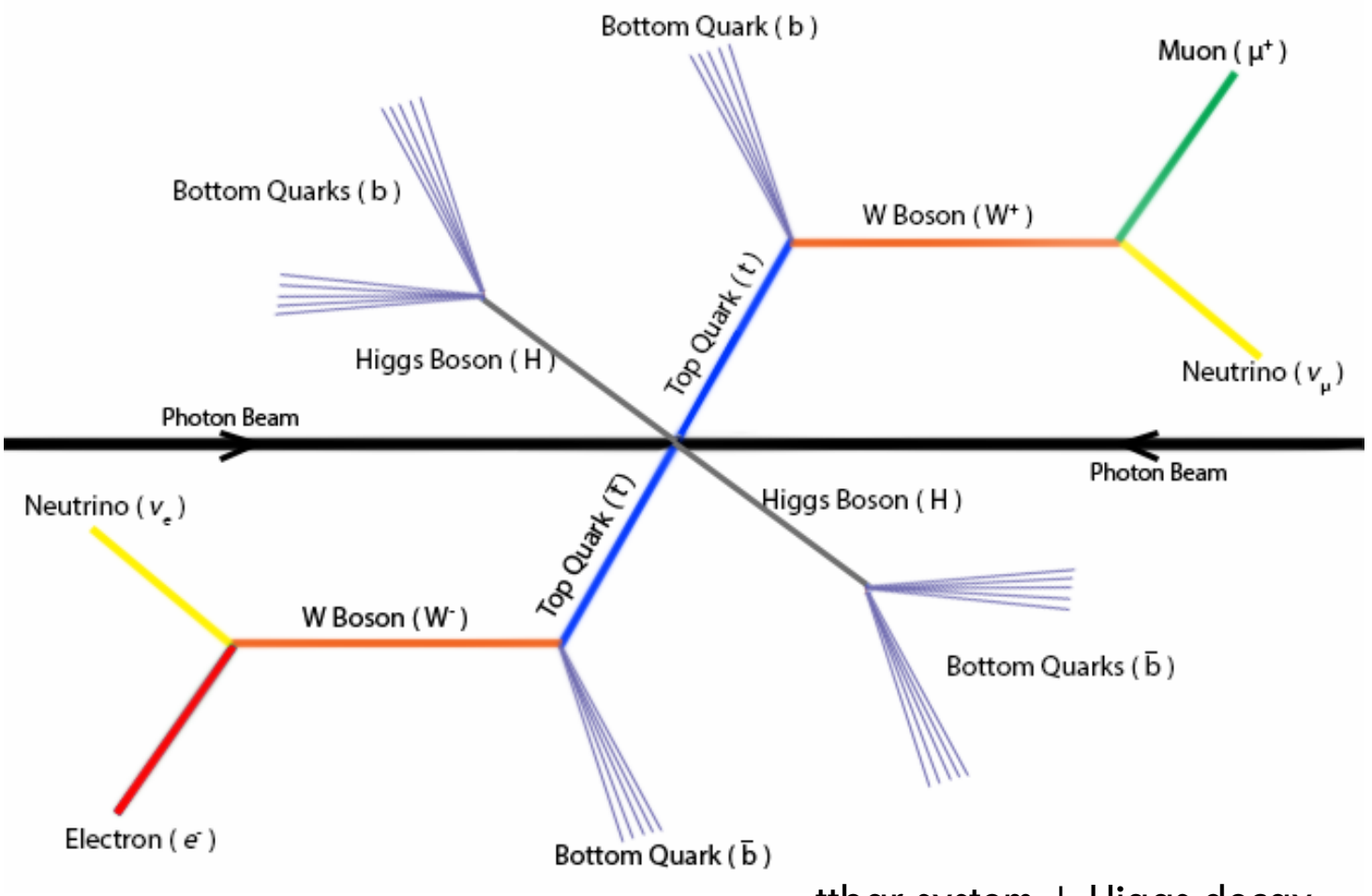
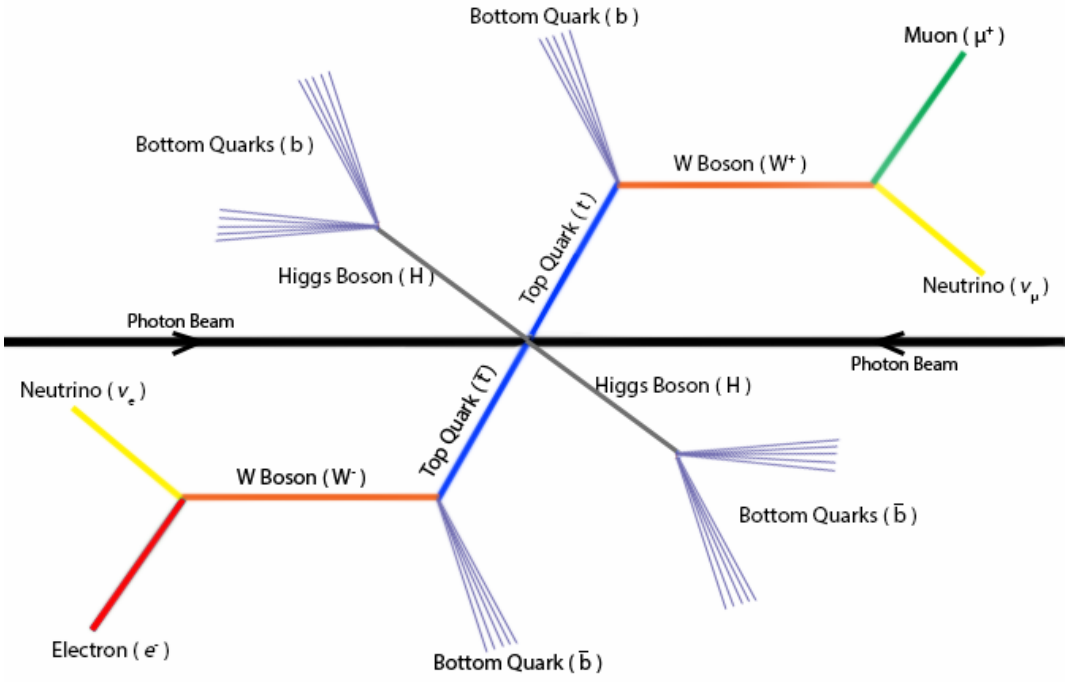
Motivation

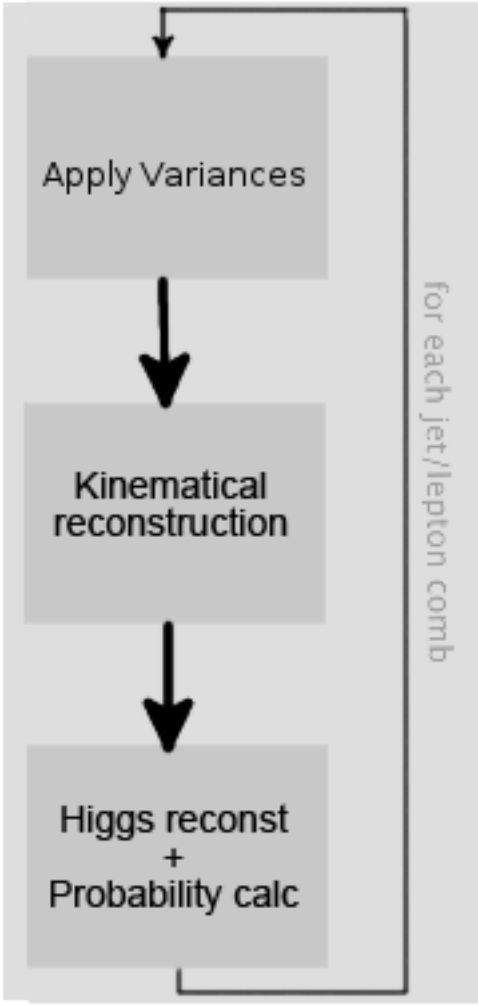


ttbar system + Higgs decay

The ttH_dilep Analysis Application

- Reconstruct the $t\bar{t}$ system (kinematical reconstruction) and Higgs bosons

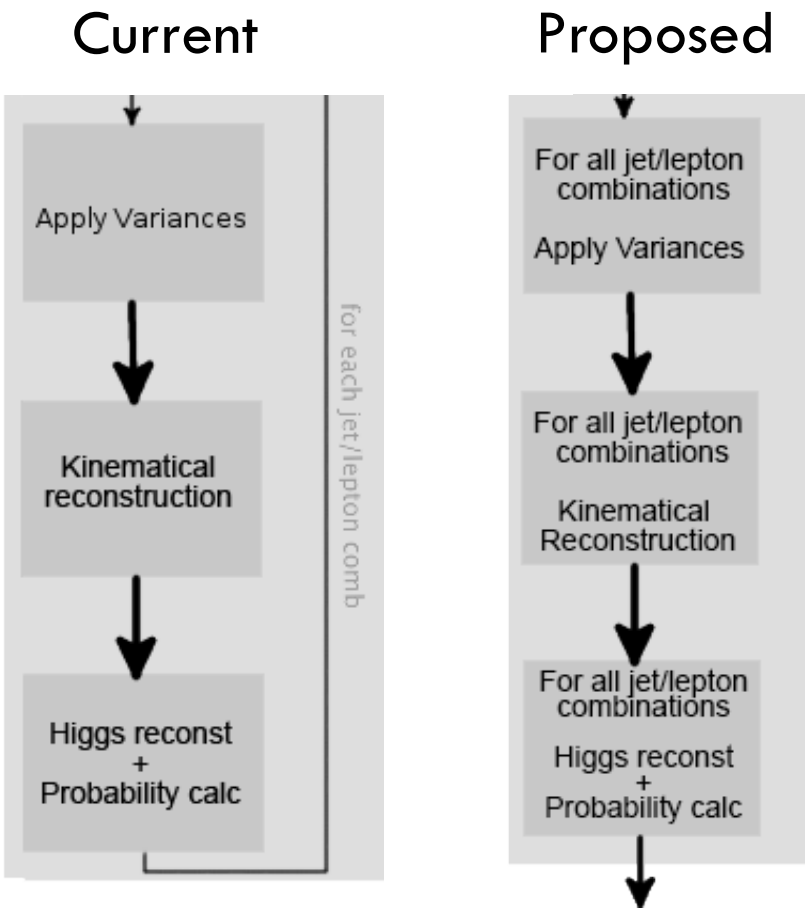




ttDilepKinFit workflow

Proposed Work

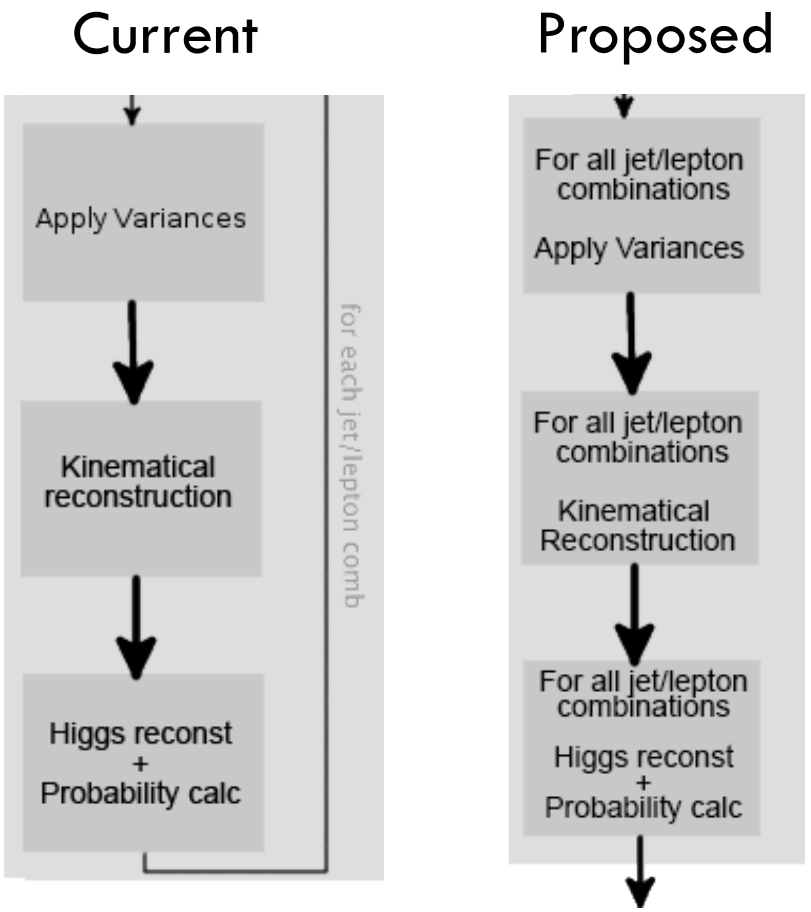
- Code analysis
- Refactor `ttDilepKinFit`



ttDilepKinFit workflows

Proposed Work

- Code analysis ✓
- Refactor `ttDilepKinFit` ✓



ttDilepKinFit workflows

Proposed Work

- Parallelization on heterogeneous platforms
  - Comparison of the accelerator devices used
- OpenACC vs GAMA

Heterogeneous Platforms

- Specific details
  - Different architectures
  - Different programming models
  - Load balancing
  - Debugging

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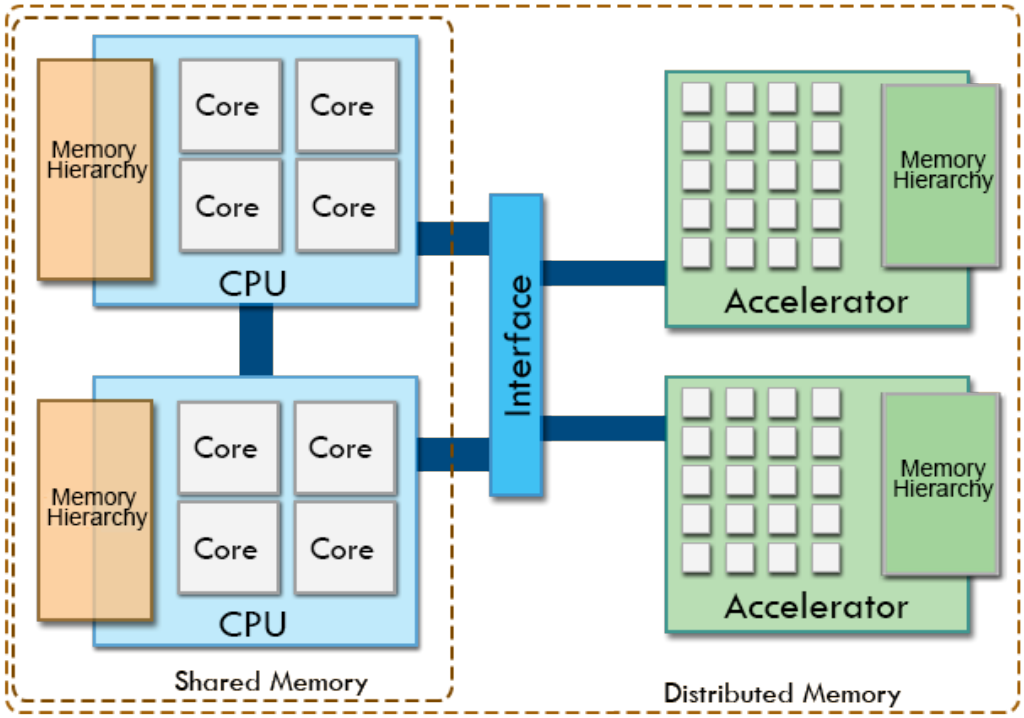

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- Specific details
  - Different architectures
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Accelerator Devices

- **G**raphics **P**rocessing **U**nits architectures
  - NVidia Fermi
  - NVidia Kepler
- Intel **M**any **I**ntegrated **C**ore architecture
  - Intel Xeon Phi

Proposed Work

- Parallelization on heterogeneous platforms
  - Comparison of the accelerator devices used
- OpenACC vs GAMA

Development Frameworks

- CPU/Accelerator specific
  - OpenMP (Shared Memory CPU)
  - CUDA (NVidia GPUs)
- Heterogeneous platforms
  - OpenACC, …
  - GAMA, …

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