FCC Software@Muon Collider

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FCC Software (FCCSW) today

- FCCSW is still largely what was used for the CDR (European Strategy Update 2019)
  - Work done by a limited number of people and mostly as part time activity

- Good modular structure based on Gaudi (LHCb, ATLAS)
  - Base for Key4hep (Generalisation of deliverables/components)

- Provide support for all the required functionality
  - Event Data Model, Generators, Detector geometry, Fast/Full simulation, Reconstruction, Non-event background inclusion, ...

- Current main limitations are in the implemented functionality
  - Palette of detector concepts with parametrized description → Quality of the description
  - Palette of detectors with detailed geometry description → Digitisation of their signal
  - Reconstruction algorithms

Muon Collider Collaboration Meeting  July 3, 2020
FCC-hh in Full Simulation

- **FCC-hh CDR baseline**
  - Barrel, Endcap, Forward
  - Beam Pipe, Shielding
  - Magnet solenoid
  - Silicon Tracker
  - LAr ECal, Tile HCal

- **Reconstruction**
  - Tracking
    - Track seeding
    - Under development: ACTS integration
  - Calorimetry
    - Sliding window (rectangular/ellipse), Topo-clustering
    - Preliminary ML techniques

An FCC-hh like detector could be an interesting starting point for high center of mass energy muon collider.
Common software for future experiments (Common effort from: LHC, ILC, CLIC, FCC, CEPC, SCTF, HSF)

- **Ingredients**
  - Common event data model (EDM4hep)
  - Gaudi framework, DD4hep geometry description
  - Interfaces for Geant4, ROOT, Delphes, …

- **Current status**
  - EDM4hep v0.2, Core component v0.1
  - Marlin-Gaudi wrapper to use ILCSoft algorithms
  - Coming: Delphes interface, …

- **Development workflow:**
  - Regular weekly meetings, GitHub repository, documentation, deployment area on CVMFS, …

Lot of room for contribution and to express creativity.
All community will profit if new developments take place in Key4hep