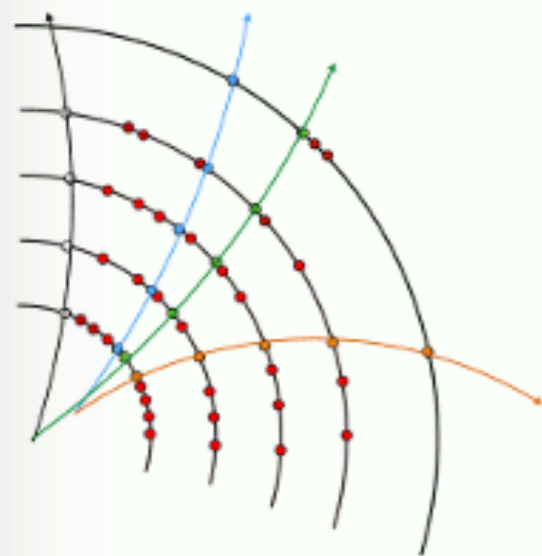




ACTS Software Update

A. Salzburger (CERN) - for the ATS developers

ACTS Release 0.03.00



ACTS 0.03.00

Reference Guide

[ACTS Home Page](#)

Main Page

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[Modules](#)

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A Common Tracking Software (ACTS) Project

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 - a. Prerequisites
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 - d. Example build on lxplus at CERN
4. Using ACTS in your own cmake project
5. Documentation
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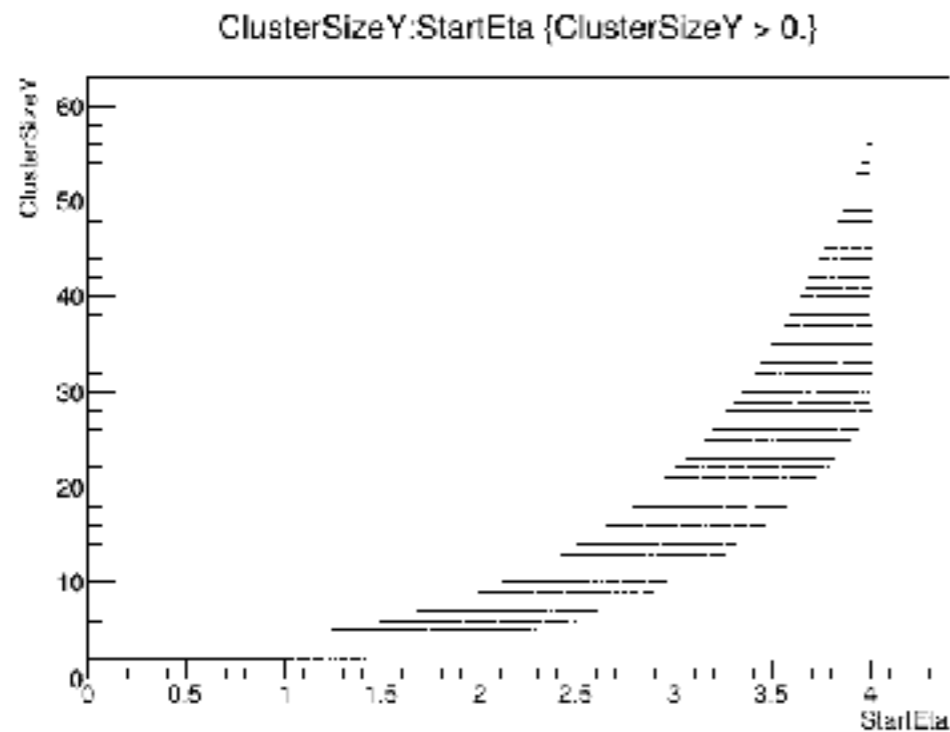
Introduction

ACTS Release 0.03.00 - FCC

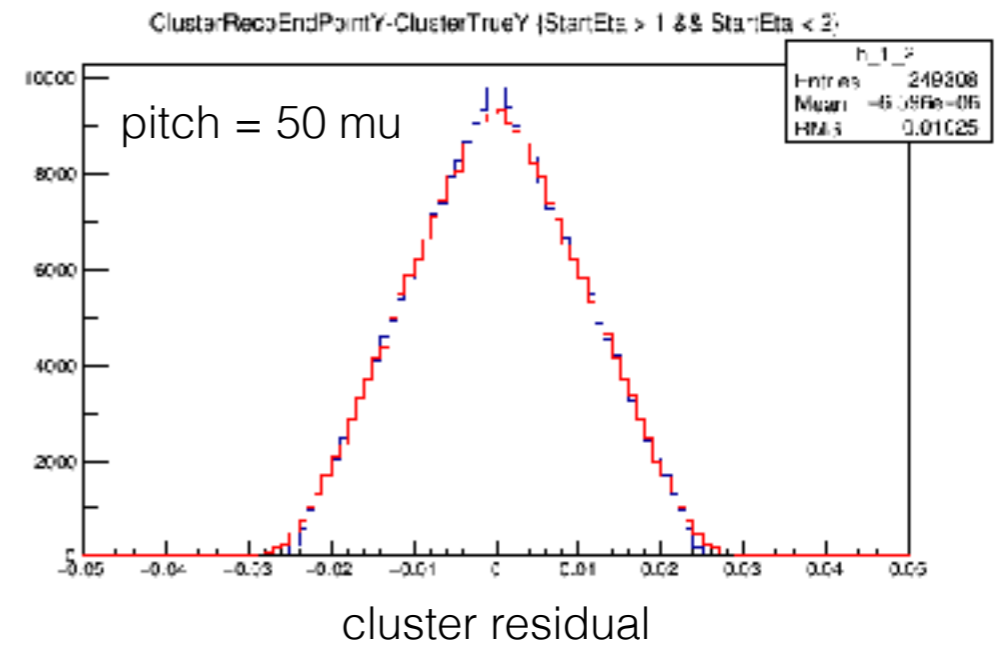
- ▶ First release to be targeted at next FCCSW release
 - includes several updates for FCCSW
 - updates from documentation sprint
- ▶ FCC related functionality
 - new FCC tracker to ACTS tracking geometry
 - fully debugged (and centralised) geometry building from DD4Hep
 - TkLayout tracker translated to DD4Hep -> ACTS module
 - Segmentation (Channel description) from DD4Hep -> ACTS readout schema tested

ACTS Release 0.03.00 - New functionality (1)

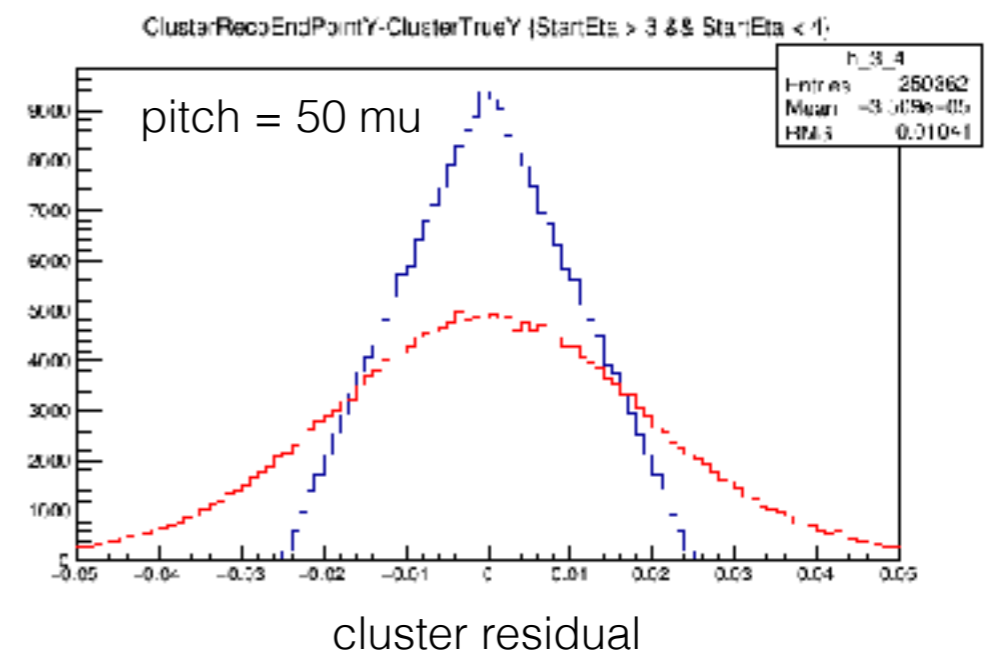
- ▶ First version of geometrical digitisation
 - with access to DD4Hep segmentation
 - > cluster sizes/residual studies



digital clustering study
with different smearing parameters

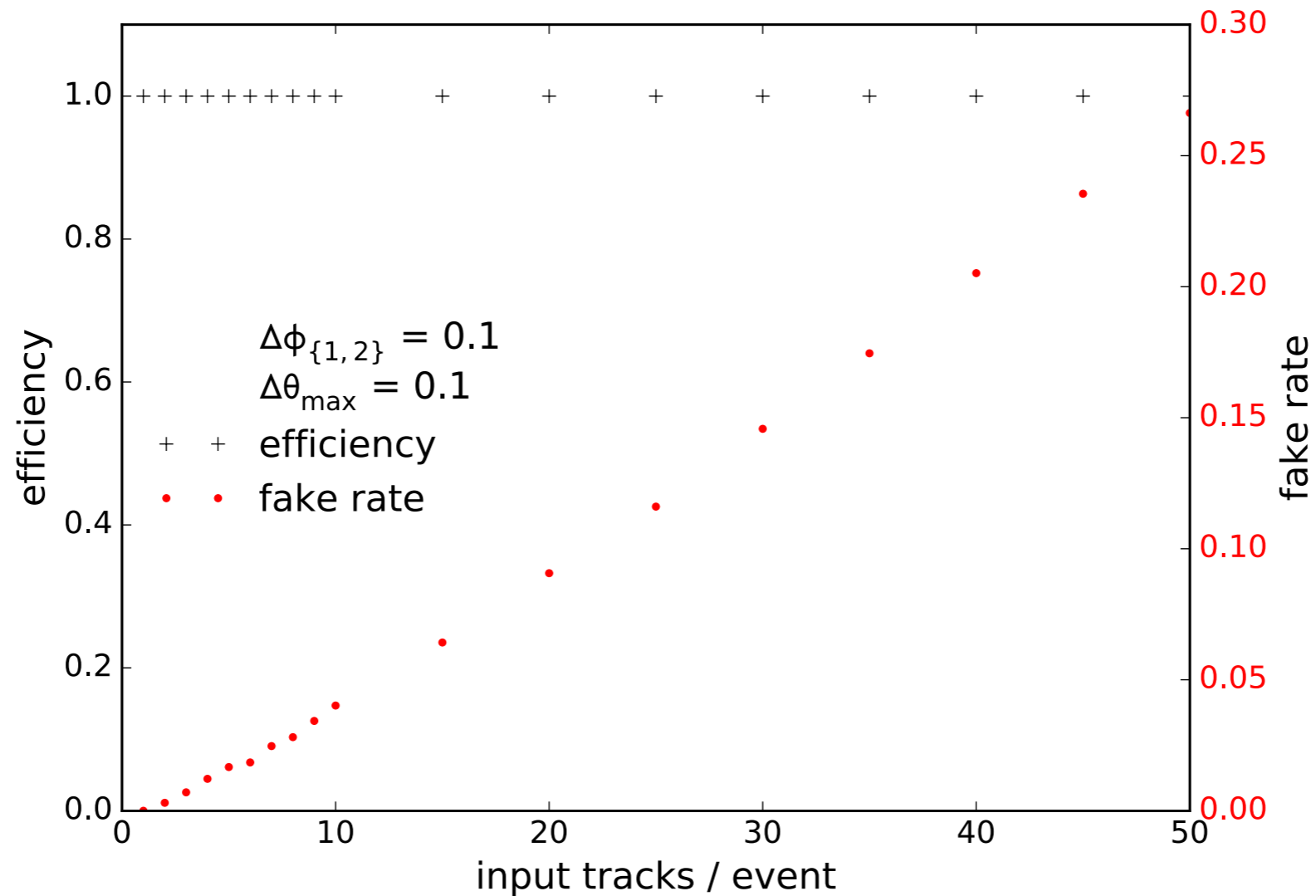


- allows channel occupancy estimations from in-time activity



ACTS Release 0.03.00 - New functionality (2)

- ▶ First version of seeding
 - shown by Moritz in last FCC-hh meeting
 - ATLAS seeding to be imported shortly



ACTS Release 0.03.00 - New functionality (3)

- ▶ First bigger concurrency tests

- implemented multi-threading test suite in ACTSFW based on OpenMP

ACTS core does not integrate a choice of MP technology,

this is simply to test the concurrency ability with our test framework

- extrapolation test through detector shows almost ideal scaling,

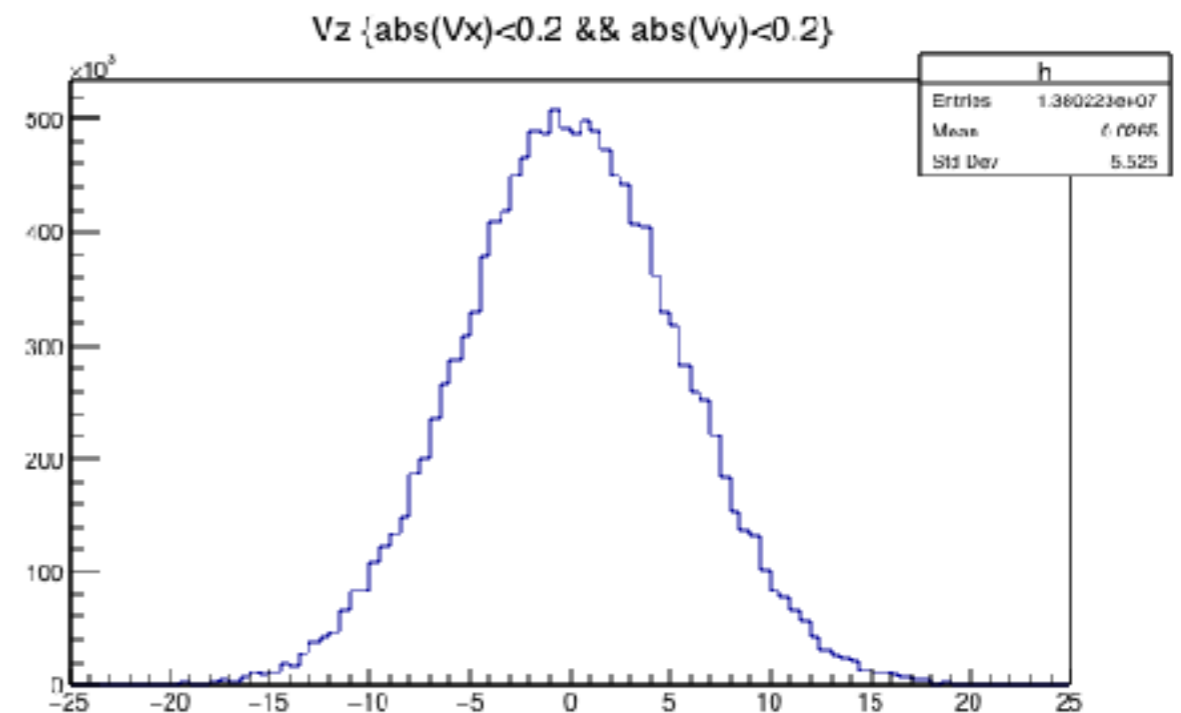
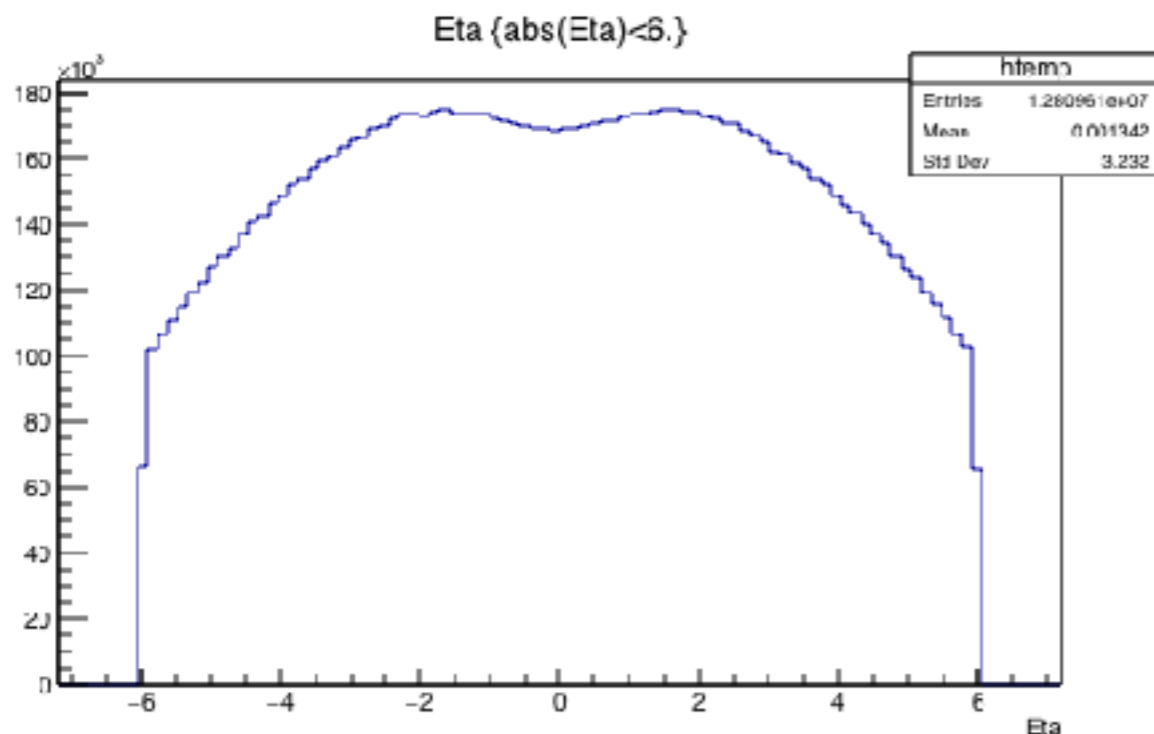
example on a 4-core CPU:

- 1 thread : 47s
- 2 threads : 24s (2.0x)
- 4 threads : 12s (3.9x)
- 8 threads : 9s (5.2x)

- important to accomplish reasonable reconstruction timing numbers

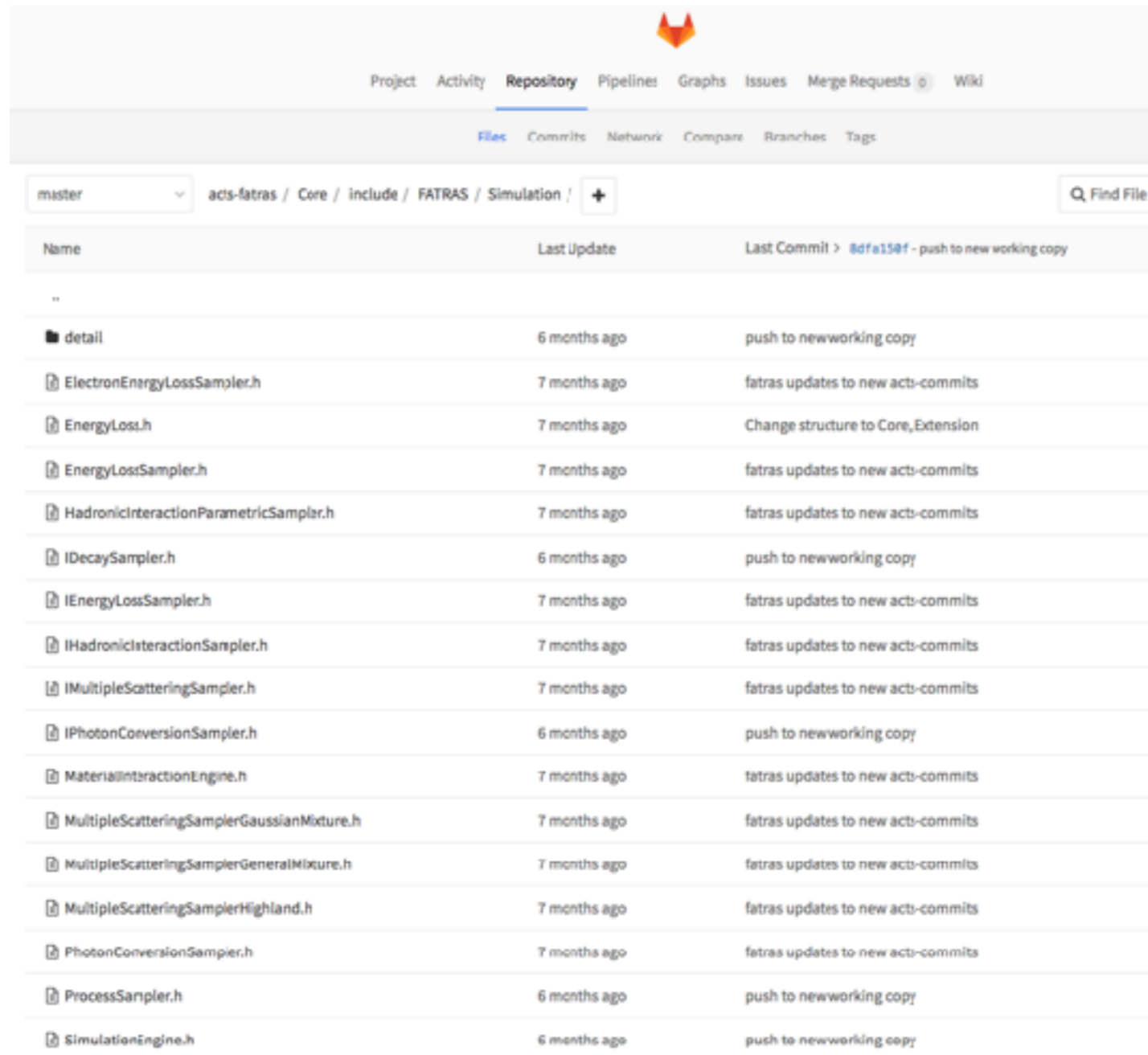
ACTS - upcoming functionality for 0.04.00 (1)

- ▶ For further ACTS development
 - interface to Pythia8 implemented with pile-up on the fly simulation
 - hard scatter and pile-up generator separately
 - vertex smearing
- ▶ Implemented in ACTS test framework ACTF



ACTS - upcoming functionality for 0.04.00 (2)

- ▶ Fast track simulation modules to be added
 - in new repository acts-fatras



The screenshot shows the GitHub interface for the 'acts-fatras' repository. The breadcrumb path is 'acts-fatras / Core / include / FATRAS / Simulation'. A table lists the files in this directory, including their names, last update times, and the commit messages for their most recent updates.

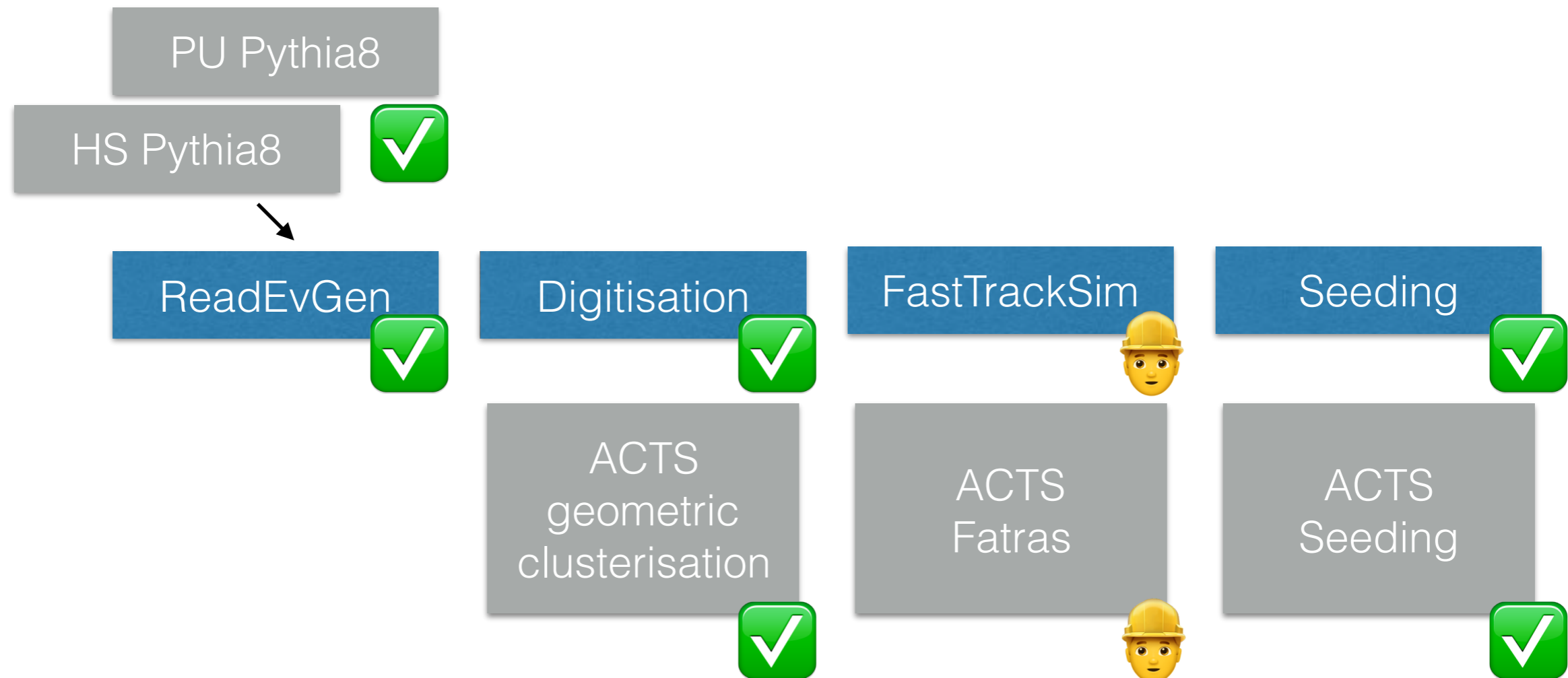
Name	Last Update	Last Commit
..		
detail	6 months ago	push to newworking copy
ElectronEnergyLossSampler.h	7 months ago	fatras updates to new acts-commits
EnergyLoss.h	7 months ago	Change structure to Core,Extension
EnergyLossSampler.h	7 months ago	fatras updates to new acts-commits
HadronicInteractionParametricSampler.h	7 months ago	fatras updates to new acts-commits
IDecaySampler.h	6 months ago	push to newworking copy
IEnergyLossSampler.h	7 months ago	fatras updates to new acts-commits
IHadronicInteractionSampler.h	7 months ago	fatras updates to new acts-commits
IMultipleScatteringSampler.h	7 months ago	fatras updates to new acts-commits
IPhotonCoersionSampler.h	6 months ago	push to newworking copy
MaterialInteractionEngine.h	7 months ago	fatras updates to new acts-commits
MultipleScatteringSamplerGaussianMixture.h	7 months ago	fatras updates to new acts-commits
MultipleScatteringSamplerGeneralMixture.h	7 months ago	fatras updates to new acts-commits
MultipleScatteringSamplerHighland.h	7 months ago	fatras updates to new acts-commits
PhotonConversionSampler.h	7 months ago	fatras updates to new acts-commits
ProcessSampler.h	6 months ago	push to newworking copy
SimulationEngine.h	6 months ago	push to newworking copy

ACTS - upcoming functionality for 0.04.00 (3)

► Fast simulation chain

- running in ACTSFW (mimicking Gaudi behaviour)

thus can be run in FCCSW as well (with adaptations to the FCCSW and EDM)



Conclusion

- ▶ ACTS development is in rapid progress
 - v0.03.00 first in-synch release with FCCSW
 - supports FCC-hh tracker building
- ▶ ACTSFW (framework) used as our development testbed
 - mimicking Gaudi, hence transition of modules to FCCSW easy
 - first Evgen-Sim-Digi-Seeding example soon to be put together
- ▶ ACTF (fast track simulation) integration is missing
 - code is imported into repository, but needs updating
 - target ACTS v0.04.00 release