First look at the update of ACTS software

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ACTs Versions

Version

Link by Shujie
https://github.com/acts-project/acts/releases

v28.2.0

Fix

- Reset navigation state correctly in KF reverse pass (#2368) (`a22a8be`) (**@andiwand**)
- Exa.TrkX edge duplicate removal (#2373) (`dd8188a`) (**@benjaminhuth**)
- Fix AMVF finding with negative cov (#2374) (`1c459a9`) (**@andiwand**)
- Track parameter estimation might give inf time (#2353) (`10b40b7`) (**@paulgessinger**)

Refactor

- Exa.TrkX boost track building & unit test (#2361) (`0eb5954`) (**@benjaminhuth**)
- Move some implementation from header to source (#2371) (`543bd5a`) (**@benjaminhuth**)
- Use `Particle::qOverP` in Fatras simulation (#2375) (`c83f8fc`) (**@andiwand**)
- Use map instead of two vectors in AdaptiveGridTrackDensity (#2338) (`f96b048`) (**@felix-russo**)
- Remove direction from `NavigationOptions` and drop constructor (#2345) (`0f745ae`) (**@andiwand**)

Feature

- ExaTrkX edge building KDTree on CPU + fixes + refactor + tests (#2360) (`0486e42`) (**@benjaminhuth**)
- Read CSV clusters and measurement-particles-map & refactor (#2103) (`342899b`) (**@benjaminhuth**)
- Make SourceLink SBO size configurable via CMake (#2357) (`7ae364d`) (**@paulgessinger**)
- Configurable maximum number of bins in SP grid (#2325) (`e9977db`) (**@LuisFelipeCoelho**)

ACTS: **A** **C**ommon **T**racking **S**oftware

How to Install EIC Recon with a ACTs version

Thanks to Wouter for commands
https://github.com/eic/EICrecon/issues/623#issuecomment-1694702542

- Scripts is better for repetitive work, I put the commands in script format (I always use it)
- The script name is **Install_Acts.sh**

Link of Script
https://drive.google.com/drive/folders/17DwFi3qDp-ZZhW5ITHpyVtOdkCD8MmB2

- First download EIC conatiner from the command in the script and type ./eic-shell
- **source Install_Acts.sh v21.1.0** **(This will compile successfull tested)**
- **source Install_Acts.sh v28.1.0** **(This gives the error)**
- It will automatically compile acts first (works fine always), then try to compile EICRecon with that ACTs version
- CMakeLists.txt in EICRecon/

We can do one by one

```
add_subdirectory( src/services )
add_subdirectory( src/algorithms )
add_subdirectory( src/benchmarks )
add_subdirectory( src/detectors )
add_subdirectory( src/examples )
add_subdirectory( src/global )
add_subdirectory( src/scripts )
add_subdirectory( src/tests )
add_subdirectory( src/utilities )
```

Even if it compiles we need to fix for running

CMake: two tasks compile and creating shared objects **(.so)** files concept of dynamic linking

```
78%] Built target ECTRK_plugin
79%] Building CXX object src/detectors/B0TRK/CMakeFiles/B0TRK_plugin.dir/B0TRK.cc.o
79%] Building CXX object src/global/tracking/CMakeFiles/tracking_library.dir/TrackParamTruthInit_factory.cc.o
79%] Building CXX object src/algorithms/reco/CMakeFiles/algorithms_reco_library.dir/JetReconstruction.cc.o
79%] Building CXX object src/services/io/podio/CMakeFiles/podio_plugin.dir/podio.cc.o
80%] Building CXX object src/algorithms/reco/CMakeFiles/algorithms_reco_plugin.dir/JetReconstruction.cc.o
80%] Building CXX object src/detectors/FOFFMTRK/CMakeFiles/FOFFMTRK_plugin.dir/OffMomentumReconstruction_factory.cc.o
80%] Building CXX object src/algorithms/reco/CMakeFiles/algorithms_reco_plugin.dir/MC2SmearedParticle.cc.o
80%] Linking CXX shared library podio.so
80%] Linking CXX shared library MPGD.so
```

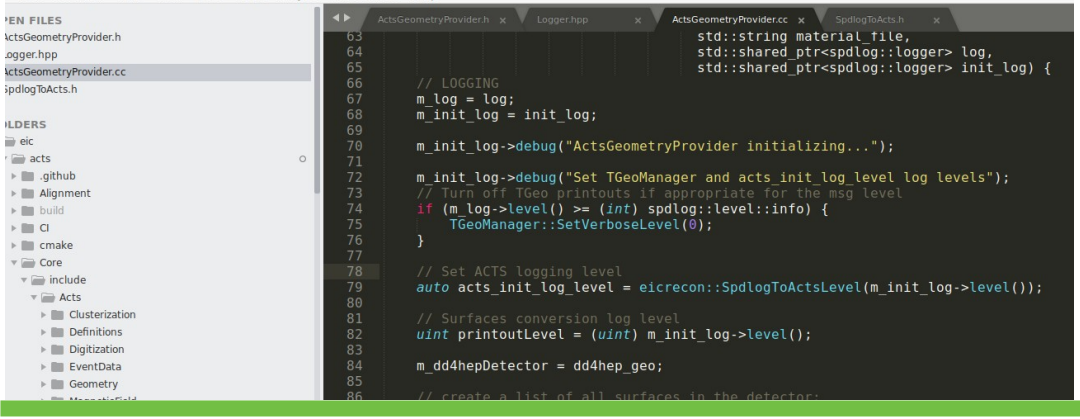
object files (.o files)

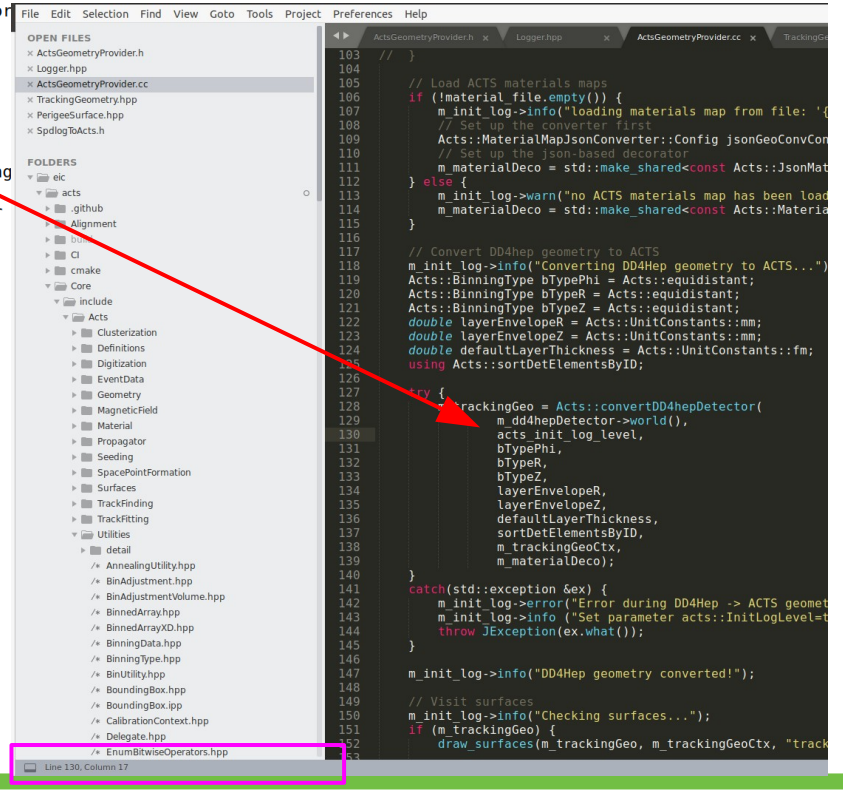
shared objects (.so)

Install EIC Recon with a ACTs v28.1.0

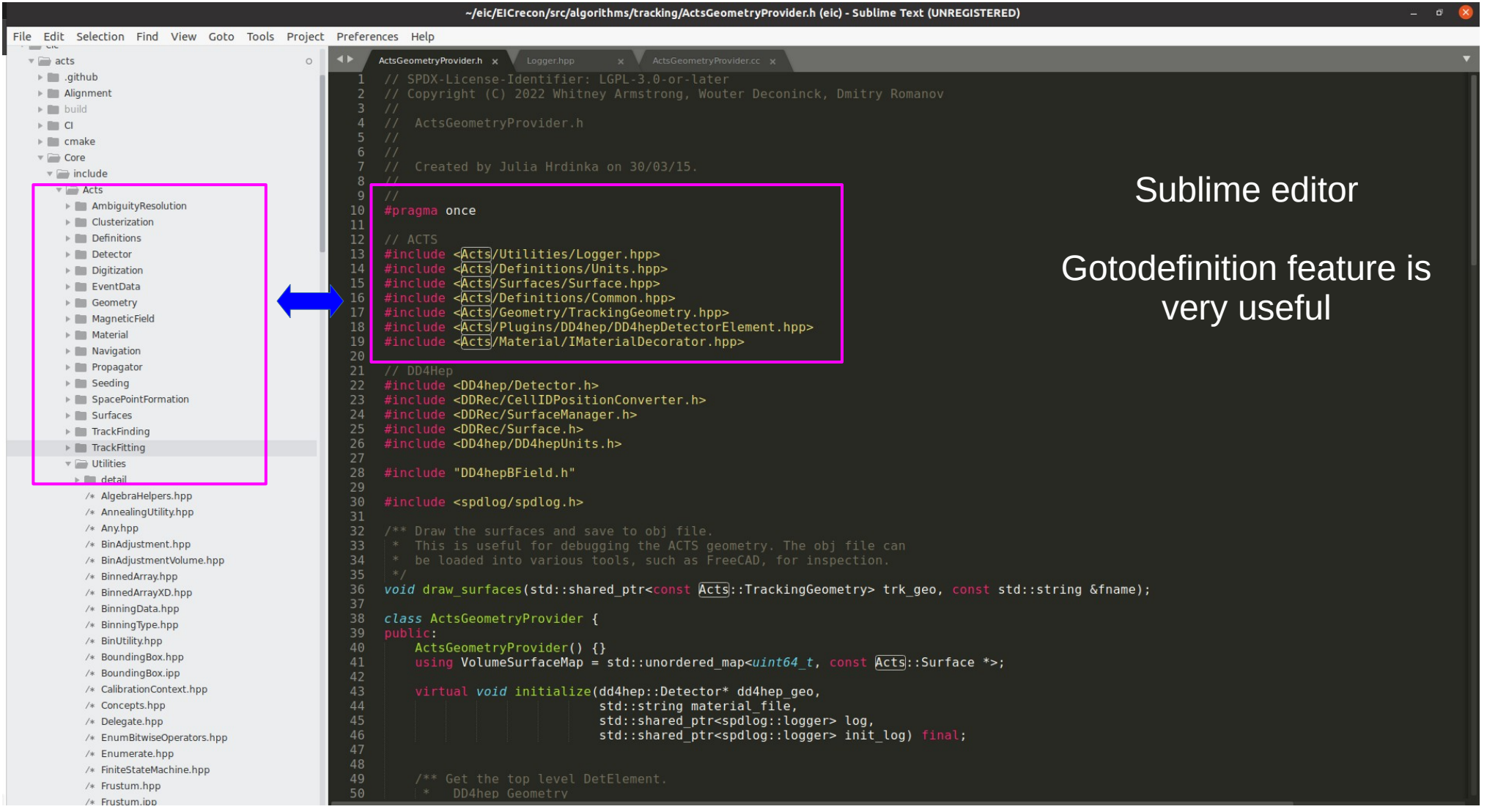
```
[  7%] Built target dd4hep_plugin
[  7%] Building CXX object src/algorithms/pid/CMakeFiles/algorithms_pid_plugin.dir/IrtCherenkovParticleID.cc.o
[  8%] Building CXX object src/services/io/podio/CMakeFiles/G__datamodel_vectors.dir/G__datamodel_vectors.cxx.o
[  8%] Building CXX object src/algorithms/digi/CMakeFiles/algorithms_digi_library.dir/SiliconTrackerDigi.cc.o
[  9%] Building CXX object src/services/geometry/richgeo/CMakeFiles/richgeo_plugin.dir/IrtGeo.cc.o
/home/shyam/eic/EICrecon/src/algorithms/tracking/ActsGeometryProvider.cc: In member function 'virtual void ActsGeometryProvider::initialize(dd4hep::Detector*,
 std::string, std::shared_ptr<spdlog::logger>, std::shared_ptr<spdlog::logger>)':
/home/shyam/eic/EICrecon/src/algorithms/tracking/ActsGeometryProvider.cc:130:17: error: invalid initialization of reference of type 'const Acts::Logger&' from
 expression of type 'Acts::Logging::Level'
  130 |                 acts_init_log_level,
      |                 ^~~~~~~~~~~~~~~~~~~
In file included from /home/shyam/eic/EICrecon/src/algorithms/tracking/ActsGeometryProvider.cc:16:
/home/shyam/eic/acts/install/include/Acts/Plugins/DD4hep/ConvertDD4hepDetector.hpp:104:55: note: in passing argument 2 of 'std::unique_ptr<const Acts::Trackin
gGeometry> Acts::convertDD4hepDetector(dd4hep::DetElement, const Logger&, BinningType, BinningType, BinningType, double, double, double, const std::function<v
oid(std::vector<dd4hep::DetElement>&)>&, const GeometryContext&, std::shared_ptr<const IMaterialDecorator>, std::shared_ptr<const GeometryIdentifierHook>)'
  104 |     dd4hep::DetElement worldDetElement, const Logger& logger,
      |                                         ~~~~~~~~~~~~~~^~~~~~
gmake[2]: *** [src/algorithms/tracking/CMakeFiles/algorithms_tracking_library.dir/build.make:76: src/algorithms/tracking/CMakeFiles/algorithms_tracking_librar
y.dir/ActsGeometryProvider.cc.o] Error 1
gmake[1]: *** [CMakeFiles/Makefile2:1479: src/algorithms/tracking/CMakeFiles/algorithms_tracking_library.dir/all] Error
gmake[1]: *** Waiting for unfinished jobs....
[  9%] Building CXX object src/algorithms/pid/CMakeFiles/algorithms_pid_plugin.dir/MergeParticleID.cc.o
[  9%] Built target G__datamodel_vectors
[  9%] Building CXX object src/services/geometry/richgeo/CMakeFiles/richgeo_plugin.dir/IrtGeoDRICH.cc.o
[ 10%] Linking CXX static library libalgorithms_digi.a
[ 10%] Built target algorithms_digi_library
[ 10%] Building CXX object src/services/geometry/richgeo/CMakeFiles/richgeo_plugin.dir/IrtGeoPFRICH.cc.o
gmake[2]: *** [src/algorithms/tracking/CMakeFiles/algorithms_tracking_plugin.dir/build.make:76: src/algorithms/tracking
dir/ActsGeometryProvider.cc.o] Error 1
gmake[1]: *** [CMakeFiles/Makefile2:1453: src/algorithms/tracking/CMakeFiles/algorithms_tracking_plugin.dir/all] Error
[ 11%] Building CXX object src/services/geometry/richgeo/CMakeFiles/richgeo_plugin.dir/ReadoutGeo.cc.o
[ 11%] Building CXX object src/services/geometry/richgeo/CMakeFiles/richgeo_plugin.dir/RichGeo_service.cc.o
^Z
[1]+  Stopped                 cmake --build build --target install -- -j8
nightly> shyam@shyam:~/eic/EICrecon$ root -l
```

Change in the class and type blue command again for compile again





Acts Classes



Sublime editor

Gotodefinition feature is very useful

Summary

- First look at the compilation of ACTs works fine with v21.1.0.
- There are so many errors v28.1.0 but if we can go one by one for each directory fix for compile and test for some example code

Thank You !!