



CORSIKA 8

Ralf Ulrich, 21.10.2021

Overview



- Welcome
- New contributors / collaborators
- Recent work
- Planning and next steps
- Organizational changes



Next meetings



All meeting agendas collected at: https://indico.scc.kit.edu/category/28/

- Need to find new meeting time (or times). Poll at https://doodle.com/poll/izk56vka4345fu6w Response is too "european" right now. Need <u>at least</u> Lukas, Remy in addition.
 - This has to become a compromise for most of us.
 - Only alternative: two meetings, alternating times.
- Next general phone call:
 - November 18th (4 weeks)
- Next topical phone calls:
 - Parallelization, in two week (to be announced)
 - E.M. showers, in three weeks (to be announced)
 - Radio, weekly (to be announced)

Recent work



Overhaul of Sibyll decay

!392 · opened 6 days ago by Felix RiehnCode Review FinishedReady to Merge



MERGED () & Approved 1 1 16 updated 11 hours ago

- Before:
 - Clear SIBYLL stack
 - Copy particle to decay from C8 to SBIYLL stack
 - Decay in SIBYLL
 - Copy particles back from SIBYLL to C8 stack
- Now:
 - Call internal SIBYLL routine "decpar" directly
 - Output is stored in local, static mini array.
 - Convert and copy array data to C8 stack.



Recent work

Remove NuclearStackExtension

 !391 · opened 1 week ago by Ralf Ulrich ③ Full physics demonstratror
 Code Review Finished
 Comments Requested

 Development
 Ready for Code Review
 Stack

- Before:
 - Nuclei had specific Code::Nucleus
 - Nuclear property data was stored on a nuclear-stack-extension (only for nuclei): A, Z
 - Nuclei were inherently different from other particles \rightarrow lots of protection code and special handling

MERGED 🕢 🍘 🗗 Approved 🖆 1 🛱 11

updated 6 days ago

- Now:
 - Code::Nucleus is 1000000000, but is only marker now for Nuclear enum range of type: 10LZZZAAAI (pdg style).
 - Examples:
 - get_nucleus_code(16,8) == Code::Oxygen
 - is_nucleus(Code::Nitrogen) == true, is_nucleus(Code::Electron) == false
 - get_mass(Code::Iron) == get_nucleus_mass(56, 26), get_mas(Code::Photon) == 0_eV



Recent work





- In TrackWriter: times are now added to tracks.parquet
- tracks.parquet is special and large output type. It is not recommended for standard use.



Ongoing discussions

(not complete)



Draft: Resolve "CI sometimes fails to run tests"	🕕 🛱 0
1395 · opened 34 minutes ago by Ralf Ulrich 🕚 First full release: CORSIKA 8.0.0 Bug Build System Continuous Integration	updated 29 minutes ago
Change logging level for InteractionHistogram::fill from info to debug	় 🛱 2
1393 · opened 20 hours ago by Jean-Marco Alameddine Development Logging	updated 45 minutes ago
Add tracking of particle times to observation plane writer	💌 🐠 Ҁ 0
1394 · opened 20 hours ago by Jean-Marco Alameddine Output	updated 11 hours ago
Hadronic model interface overhaul	💌 👩 🖳 9
1987 · opened 1 week ago by Ralf Ulrich () Full physics demonstratror (Comments Requested) (Critical) Development (In Progress)	updated 1 day ago
make conex module fit for multiple events. Added init function	🕑 🌍 🛱 0
1985 · opened 1 month ago by Ralf Ulrich ① Full physics demonstratror Development ProcessAndSequence Ready for Code Review	updated 6 days ago
WIP: Additional outputs ported to new architecture	(x) 🔁 8
1371 · opened 4 months ago by Remy Prechelt OF First full release: CORSIKA 8.0.0	updated 1 week ago
Draft: Move our build requirements to c++20 !388 · opened 1 week ago by Ralf Ulrich ④ Full physics demonstratror Build System Comments Requested Continuous Integration Discussion Never Merge	🛞 <table-cell> 🛱 5 updated 1 week ago</table-cell>
WIP: Proposal v7.1.0	💌 🋞 🛱 1
1396 · opened 2 hours ago by Jean-Marco Alameddine EM	updated just now

Bug in Cascade.inl

!397 · opened 32 minutes ago by Nikos Karastathis Bug Comments Requested

✓ ■ ■

updated 32 minutes ago

Ongoing discussions



Add tracking of particle times to observation plane writer	💌 🍩 ⊏ 0
1394 · opened 20 hours ago by Jean-Marco Alameddine Output	updated 11 hours ago
Hadronic model interface overhaul	🛞 🍘 🔁 9
1387 · opened 1 week ago by Ralf Ulrich 🕚 Full physics demonstratror <u>Comments Requested</u> Critical Development In Progress	updated 1 day ago
make conex module fit for multiple events. Added init function	🕑 🌍 🖻 0
1385 · obened 1 month ado by Ralf Ulrich O Full physics demonstratror Development ProcessAndSequence Ready for Code Review	updated 6 davs ago

- Before:
 - InteractionProcess was too much integrated into ProcessSequence and Cascade. Access to every bit of detail (e.g. Environment, Stack, etc) was needed from within.
- After:
 - The interface simplified to the minimally needed information:

CrossSectionType getCrossSection(Code projId, Code targId, FourMomentum projP4, FourMomentum targP4);

template<clss Tstack> doInteraction(TStack& stack, Code projId, Code targId, FourMomentum projP4, FourMomentum targP4);

where stack, only needs to provide a single method: TStack::addSecondary(pid, momentum [, ...]);

and the two FourMomentum define the system for the output particles via: COMBoost(projP4, targP4);

This means, interaction models can be directly access by tools like CRMC using the exactly same interface.



Ongoing discussions



Hadronic model interface overhaul	💌 🍘 द 9
1387 · opened 1 week ago by Ralf Ulrich 🕐 Full physics demonstratror Comments Requested Critical Development in Progress	updated 1 day ago
make conex module fit for multiple events. Added init function	🅑 🜍 🖻 0
1385 - opened 1 month ago by Ralf Ulrich 🕜 Full physics demonstratror (Development) (ProcessAndSequence) (Ready for Code Review)	updated 6 days ago
WIP: Additional outputs ported to new architecture	💌 Г 8

- Before:
 - CONEX was called "by hand" after normal C8 finished
- After:
 - Add new: CascadeEquationsProcess
 - Run automatically as part of ProcessSequence
 - Status: ready
 - <u>Future update</u>: re-create particles on C8 stack.



Planning and milestones



Radio Emission started on Jun 25, 2020 Air Shower Physics / corsika	4 Issues · 5 Merge Requests	75% complete	1 Close Milestone
First full release: CORSIKA 8.0.0 Air Shower Physics / corsika	49 Issues · 13 Merge Requests	28% complete	Close Milestone
Full physics demonstratror Air Shower Physics / corsika	36 Issues · 12 Merge Requests	69% complete	1 Close Milestone

• Need to spend more effort on milestone planning: look at the content and plans. Comment on this. <u>Assign Issues and MR</u> to milestones. This is important to reach our main goals.

