Subject
Status of the novel CORSIKA 8 air shower simulation framework

What is it?
The CORSIKA 8 project is an international collaboration of scientists working together to implement a modern, modular, flexible, robust and efficient framework for the simulation of ultra-high energy secondary particle cascades in matter. The framework is completely open for the community, both, for contributions as well as for applications. Get in contact starting at https://gitlab.ikp.kit.edu/AirShowerPhysics/corsika

Scope
While the main application is for simulating cosmic ray air showers, the project will be useful for other problems in astro(particle)-, particle- and nuclear-physics.

Goal
- Provide a comprehensive and state-of-the-art collection of physics models and algorithms relevant for the field, interfaces to deployment modern multicore processors and hardware accelerators (e.g. GPU).
- Offer a regular platform for discussion and collaboration for Monte Carlo simulations and related problems and uncertainties for the astroparticle community with the aim to provide the best possible and most robust tool for a very wide range of physics questions.

Status
Main elements of framework are there in a preliminary but functional state. Major developments are still planned and ongoing. As soon as the output-format is fully available any application to real physics problems and validation/application for physics analyses will become feasible without any burden of the ongoing development on a lower level. Feedback and help in this direction are very welcome.

Physics module snapshot
- High energy hadron models: SIBYLL2.3d, QGSJetII.4 (EPOS-LHC)
- Low energy hadron models: UrQMD1.3c, (FLUKA, Hillas Splitting)
- Electromagnetic model: PROPOSAL
- Cascade equations: CONEX

- Full 3D tracking, magnetic fields (aka CURVED, SLANT, UPWARD)
- Modular Radio emission interface and models
- Cherenkov photon emission
- Various atmosphere models, variable geometry/medium options
- Beyond-air applications
- Standard output format, and python analysis package (ongoing)