Python-based tools and frameworks for KM3NeT

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The KM3NeT collaboration builds, operates and maintains two water Cherenkov detectors for neutrino astronomy and physics studies, which are currently being built in the Mediterranean Sea. In order to operate the detector infrastructure and exploit scientifically the recorder data, a sophisticated software environment is necessary. For several tasks, e.g. the monitoring of the detector, Python-based solutions are available. The main data acquisition software is implemented in C++ and the data is written out to a customized ROOT file format. In order to provide access to the data within a Pythonic environment, the km3io project utilizes the uproot package. The processing of data can be handled using km3pipe, which is a pipeline work flow framework based on the thepipe project and adding many specialized KM3NeT functionalities. For the simulation of neutrino events the GiBUU neutrino generator is adapted to the KM3NeT detector environment via the km3buu Python package. Besides a general overview over the Python tools and frameworks developed and utilized in KM3NeT, the focus of the talk lies on those three packages.

Authors: SCHUMANN, Johannes (University of Erlangen); GAL, Tamas (University of Erlangen)
Presenter: SCHUMANN, Johannes (University of Erlangen)
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