AstroAnt

Astronomical analyses of ANTARES neutrino telescope data in python

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KM3NeT

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AstroAnt's task

Background
- observatories (observe celestial objects on request) usually provide software to
  - reduce data
  - calibrate data
  - extract signal and background

Neutrino astronomy
- new telescopes with significant detections per year under construction

Aim
- be prepared once observatory level is reached

Task
- develop prototype software based on data from ANTARES
  - → **AstroAnt**

Observatory Bamberg
© M. Bissinger
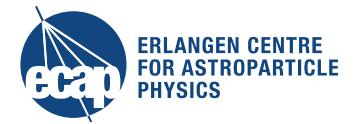
Python modules

- **antdb** - observation (aka run) database layer
  - select runs of interest + apply data quality requirements

- **pipe** - event-by-event processing
  - filter, i.e. data cuts
  - (re)calibration

- **astro** - astronomical routines
  - extract data from sky region
  - predict signal (energy spectrum)

- **ares** - high level pipeline
  - automatic signal and background extraction for certain sky region
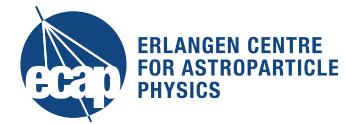
Examples

- Run selection

```
from astro_ant.antdb import Runs
runs = Runs()
runs.selectPhysics()
runs.selectDate(2015, 2019)
runs.save('runlist')
```

- Calibration and event rejection

```
from astro_ant.pipe import mc,common
…
pipe.attach(FixTriggerBug)
Pipe.attach(CutFilter,
    aafit = { 'Lambda': lambda x: x >= -6 })
```

- High level data extraction

```
from astro_ant.ares import AntProject
project = AntProject('/home/me/ant')
project.extract('sky.reg')
```

Summary
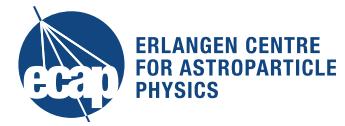
AstroAnt

- observatory style data reduction tools and pipeline for ANTARES data

- serve as prototype for KM3NeT data (successor)

GIT repository

- https://gitlab.in2p3.fr/antares-nt/astro_ant

  (sign in via EduGAIN)