STEREOGRAPH

Status Update

Hana Ali Messaoud,CDD, LAPP, Annecy (France)
hana.alimessaoud@lapp.in2p3.fr

# Stereograph ?

- **Gamma Learn :** launched in 2017 through a collaboration between LAPP and LISTIC.
- **Goal :** to develop innovative methods in AI and deep learning for the CTAO observatory project.
- **Stereograph** (started in 2024)
- **Objective :** to explore stereoscopic reconstruction of gamma events using graph neural networks
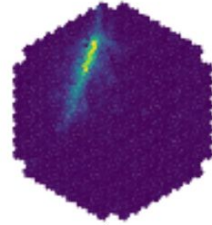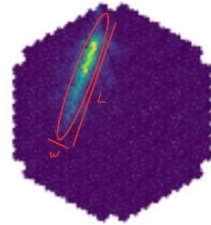
Event Detection

Incoming particle

Atmospheric shower

Cherenkov light

Virtual impact point
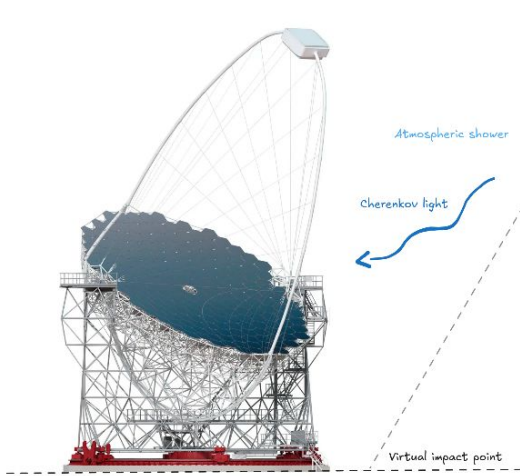
40 snapshots
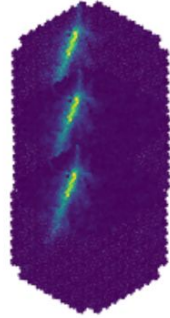
Integration

Hillas parameters

L

w

Machine learning Algorithm

- Energy
- Direction
- Type

- Gamma photons interact with the atmosphere and generate particle cascades (atmospheric shower).
- The charged secondary particles travel faster than light in the atmosphere and emit blue light (Cherenkov radiation).
- This light is detected by ground-based telescopes.

The **stereoscopic** event reconstruction

Stereoscopy : By combining the observations of all telescopes
to give a common estimation of a recorded shower
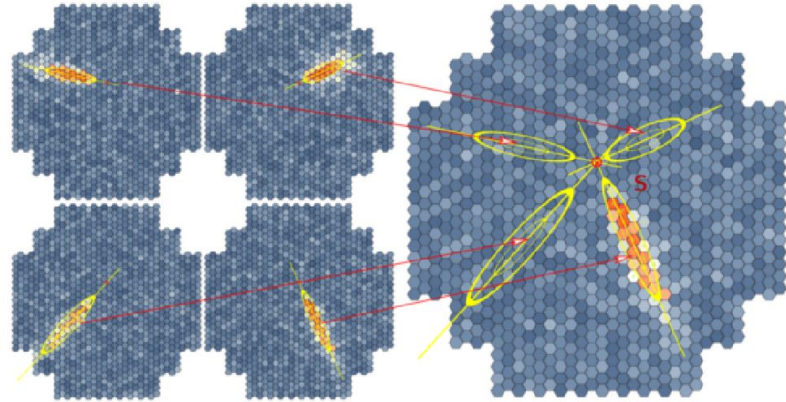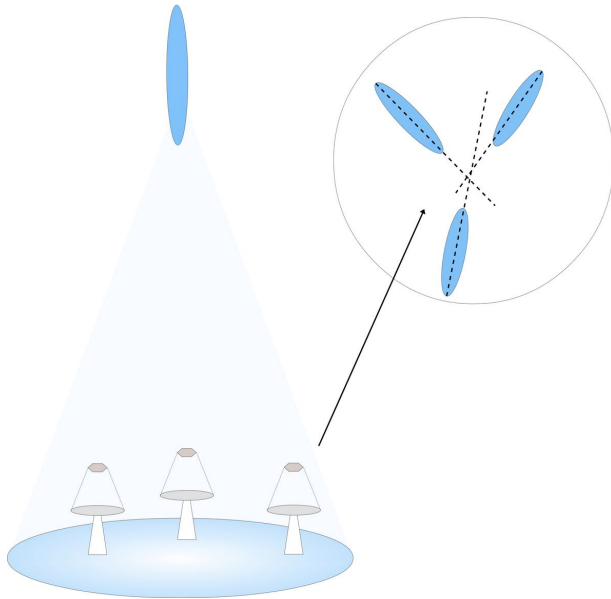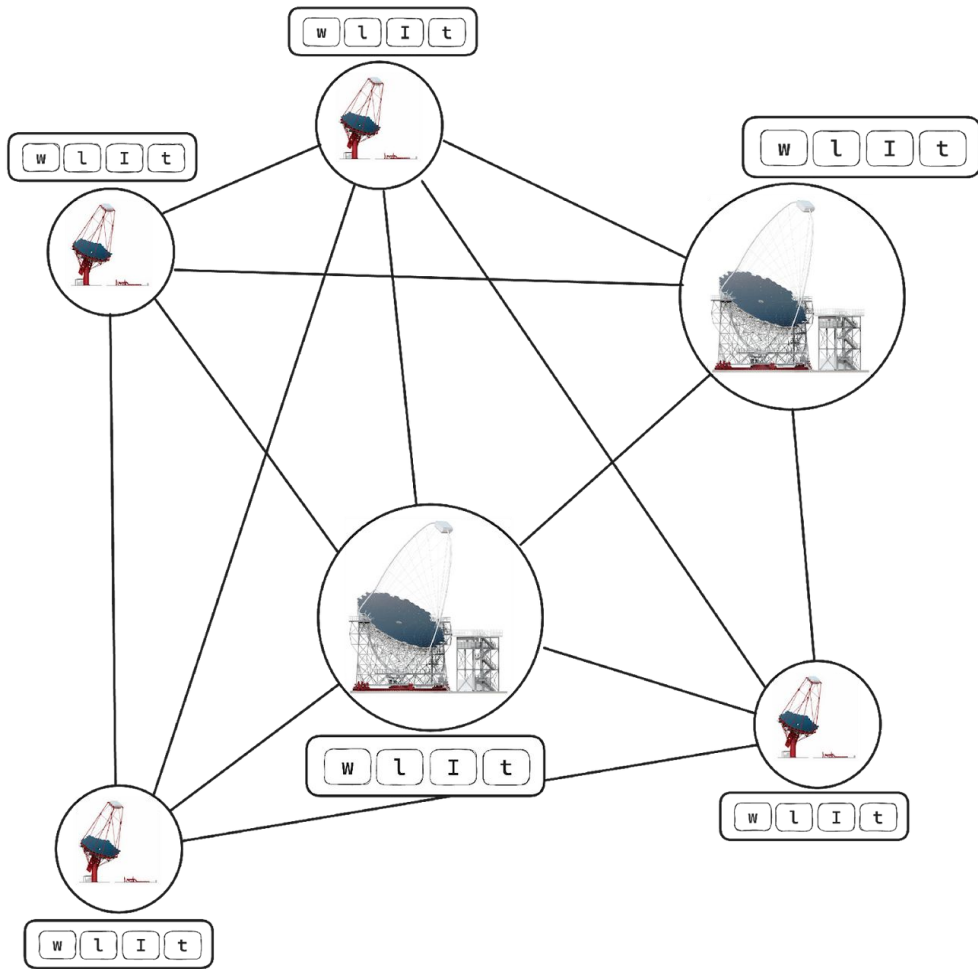
Direction

Energy

Class

Status update

- **Goal :** Perform a fully reproducible analysis using the open data (on Zenodo)

  $\longrightarrow$ Train model, run inference, and visualize Instrument Response Functions (IRFs).

- **Already implemented :** ✅

- **CI/CD Pipelines :** Stereograph's CI/CD pipelines generate containers that provide a ready-to-use environment for development

- **Code packaging** (soon to be uploaded to PyPI)

- **Documentation**

Current progress

- A notebook is running successfully on the Virtual Research Environment (VRE). ✅

- **Next step :**

        -Stereograph release

        - Upload Stereograph to Zenodo from the Gitlab repository

Links

- Gitlab repository :

  https://gitlab.in2p3.fr/gammalearn/gammana/stereograph

- Documentation :

  https://gammalearn.pages.in2p3.fr/stereograph/stereograph/