

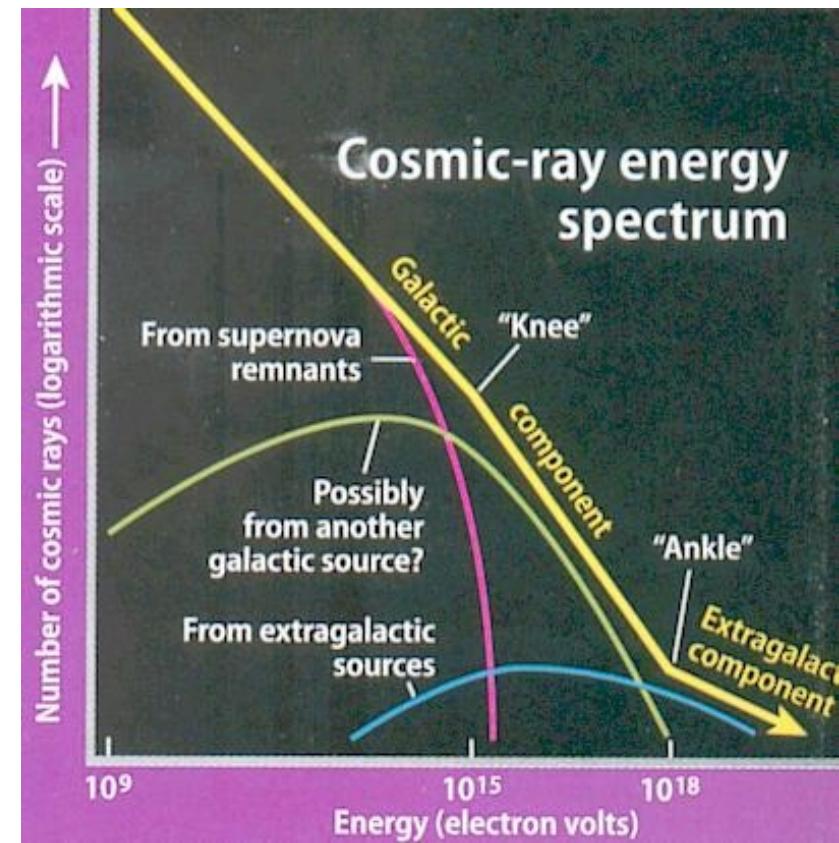
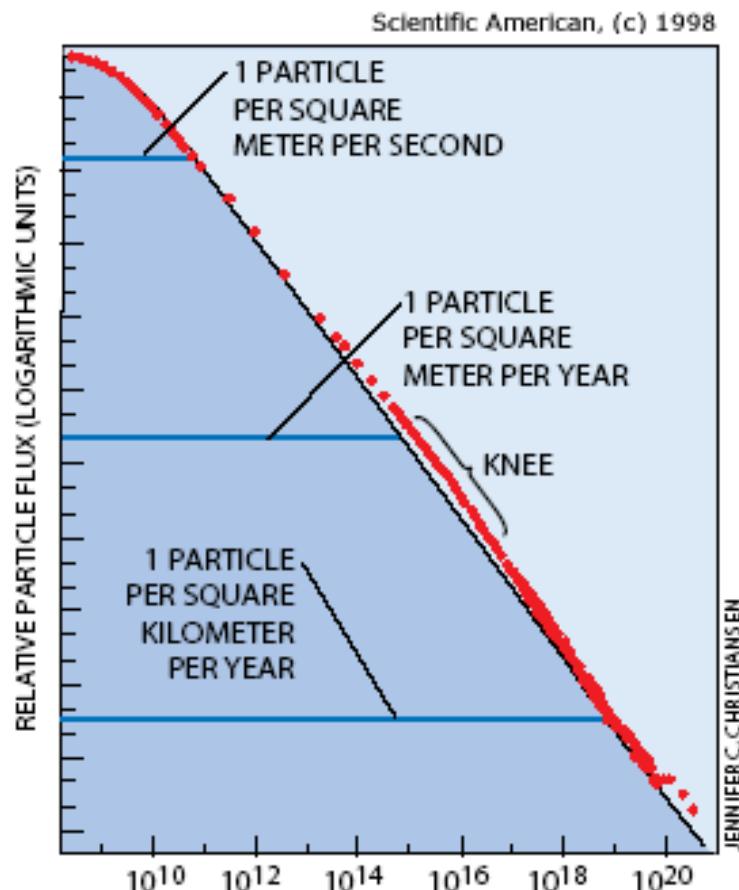
ASTROPARTICAL PHYSICS II

COSMIC RAY DETECTION

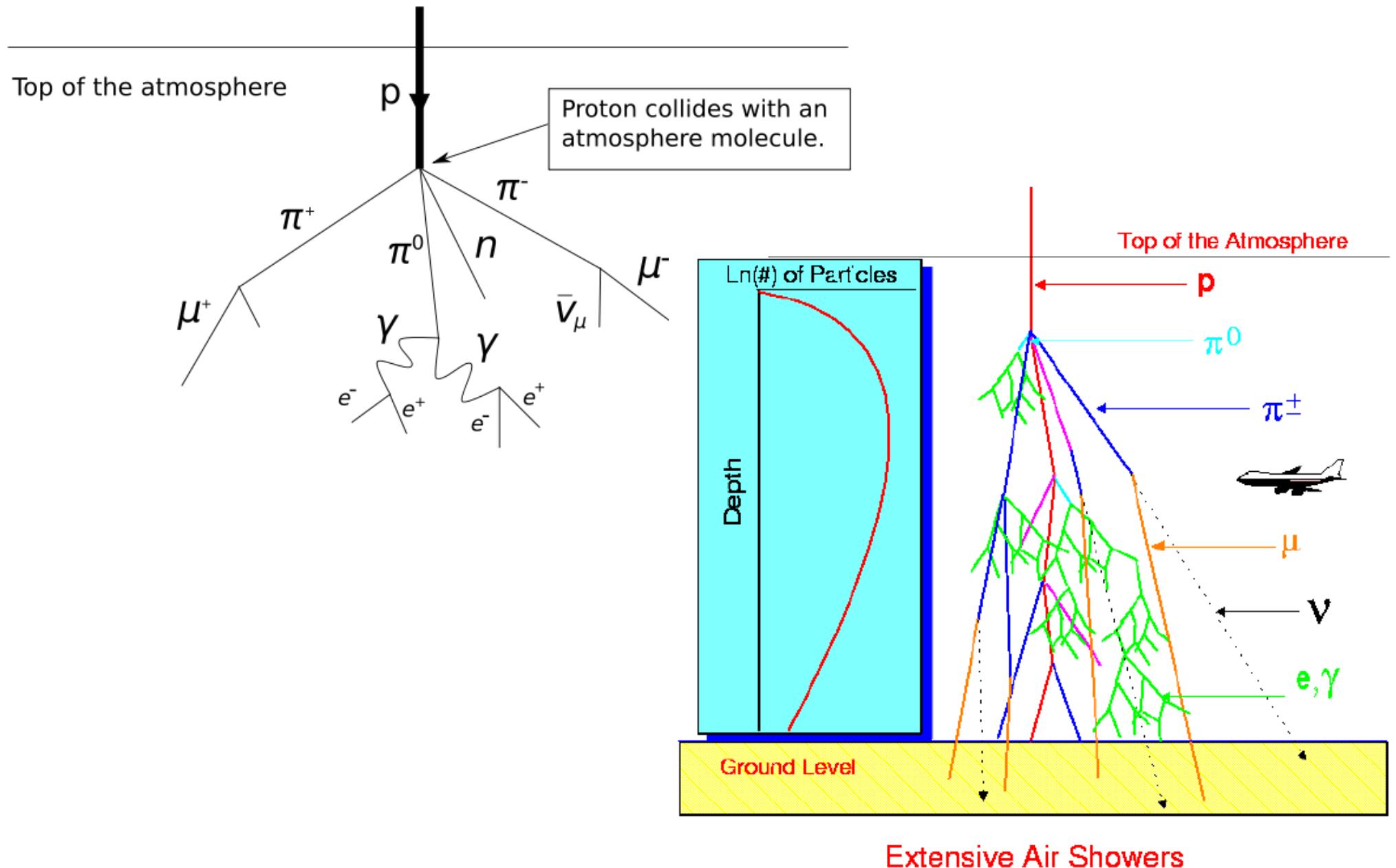
Jana Köhler

Cosmic ray spectra

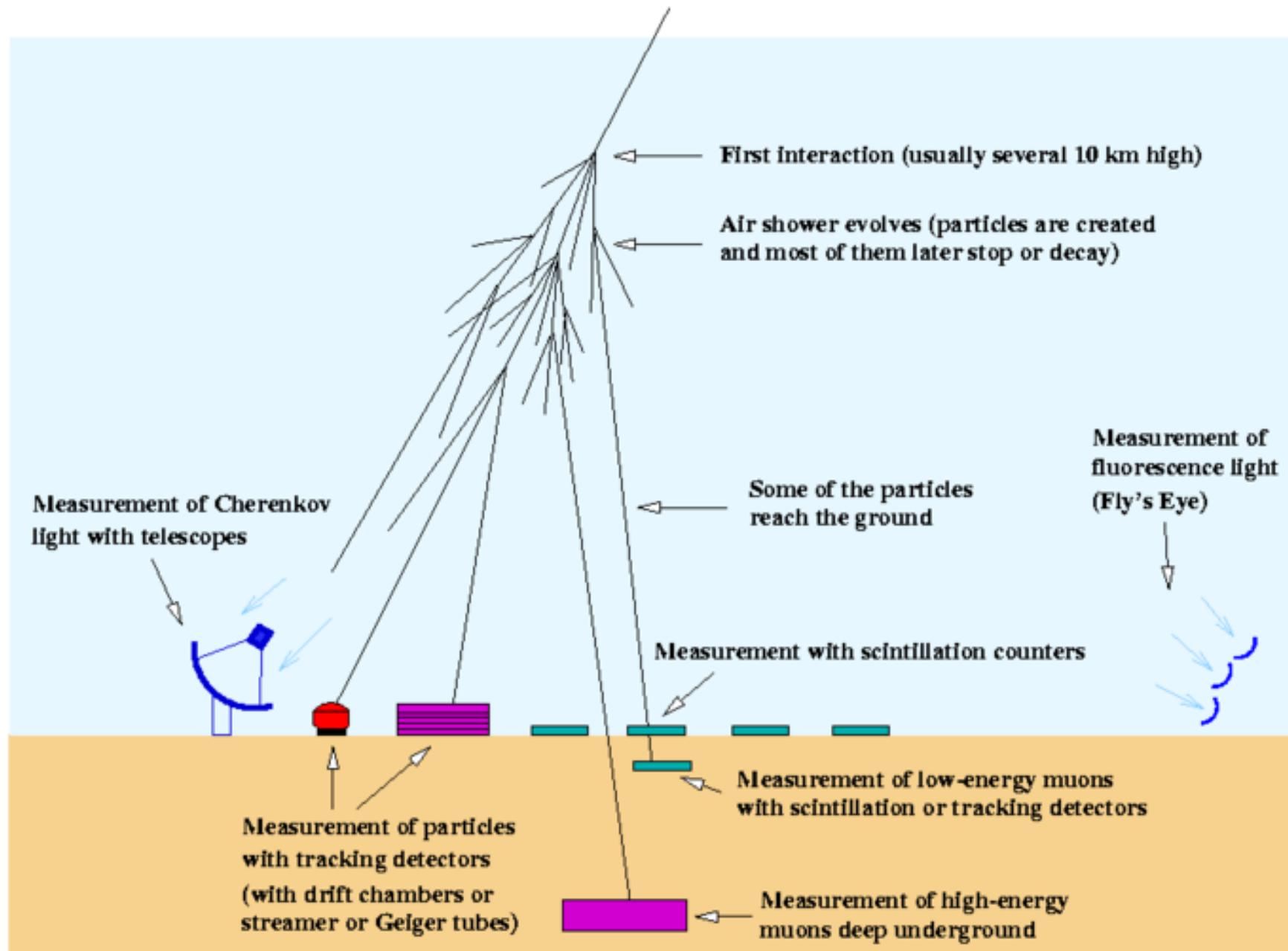
- Repetition: CR are 90% protons, 9% α -particles and 1% others



Particles in air shower



Measuring cosmic ray air showers



Different ways of air shower detection

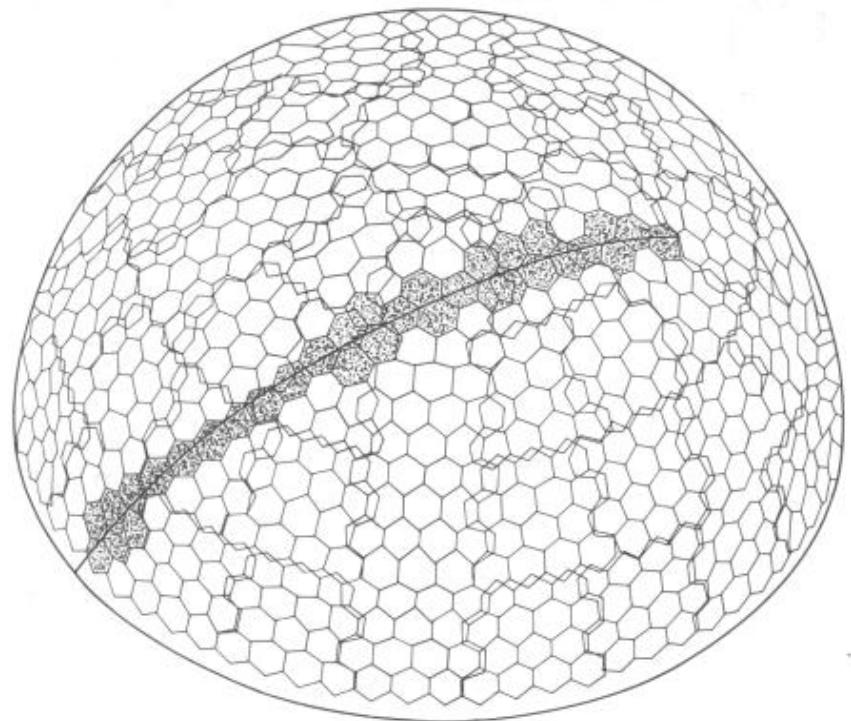
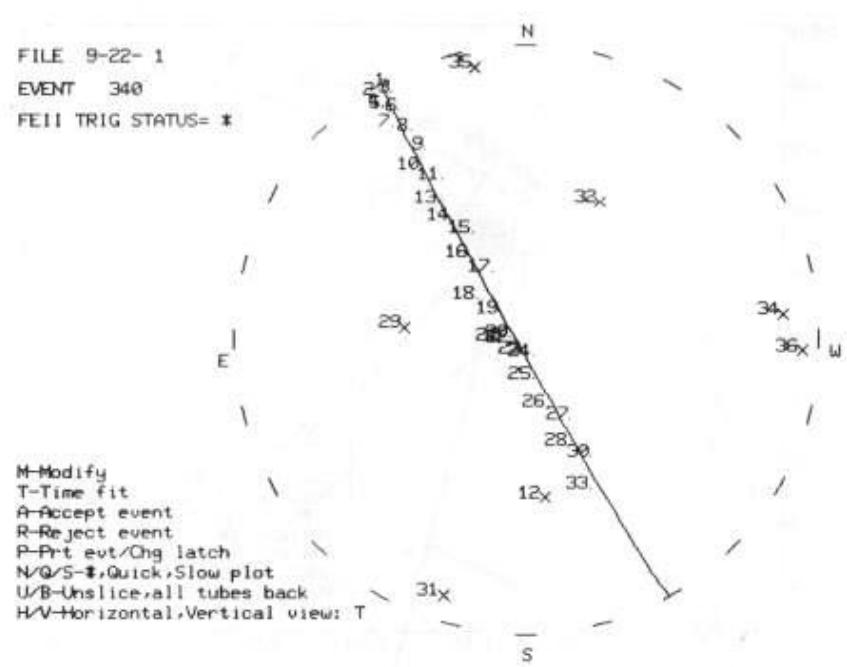
- Air shower arrays:
 - CASA, GAMMA, KASCADE, ...
- Cherenkov detectors:
 - **MILAGRO**, VERITAS, IAC, ...
- Fluorescence experiments:
 - **Fly's Eye**, ASHRA, HiRes, ...
- Radioantennas:
 - **LOFAR**, LOPES, KASCADE, ...

Observatories and experiments

- Ground Experiments:
 - The Fly's Eye, CHICOS, GAMMA,...
- Satellite Experiments:
 - PAMELA, Voyager, Cassini-Huygens,...
- Balloon Experiments:
 - BESS, ATIC, TRACER, BOOMERanG,...
- Ultra high energy cosmic rays:
 - MARIACHI, LOPES, AGASA,...

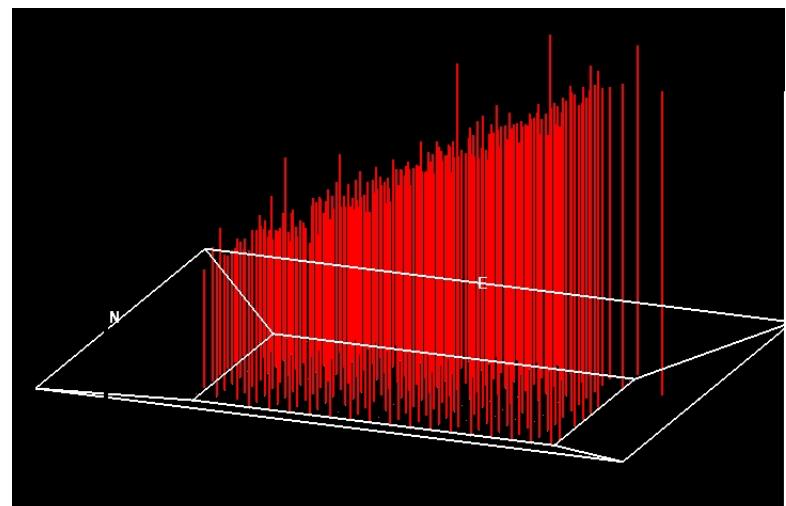
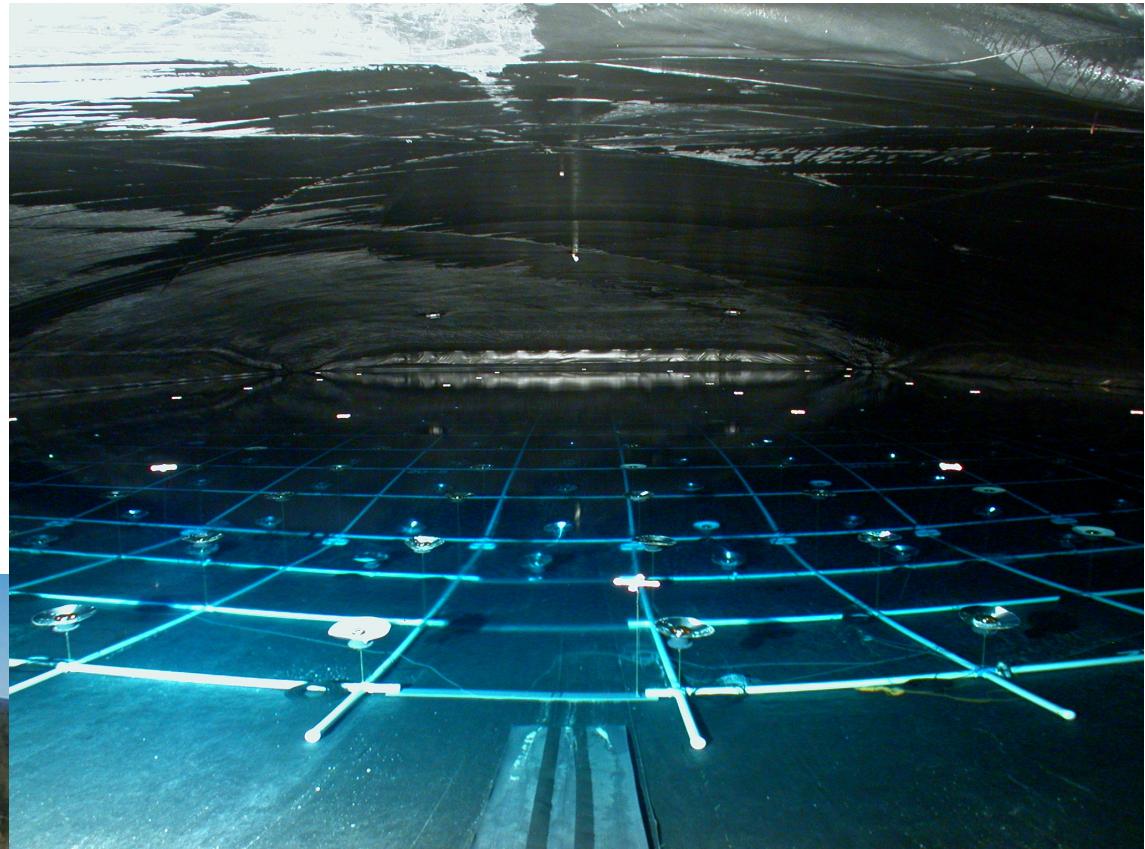


The Fly's Eye (1981-1993)



MILAGRO

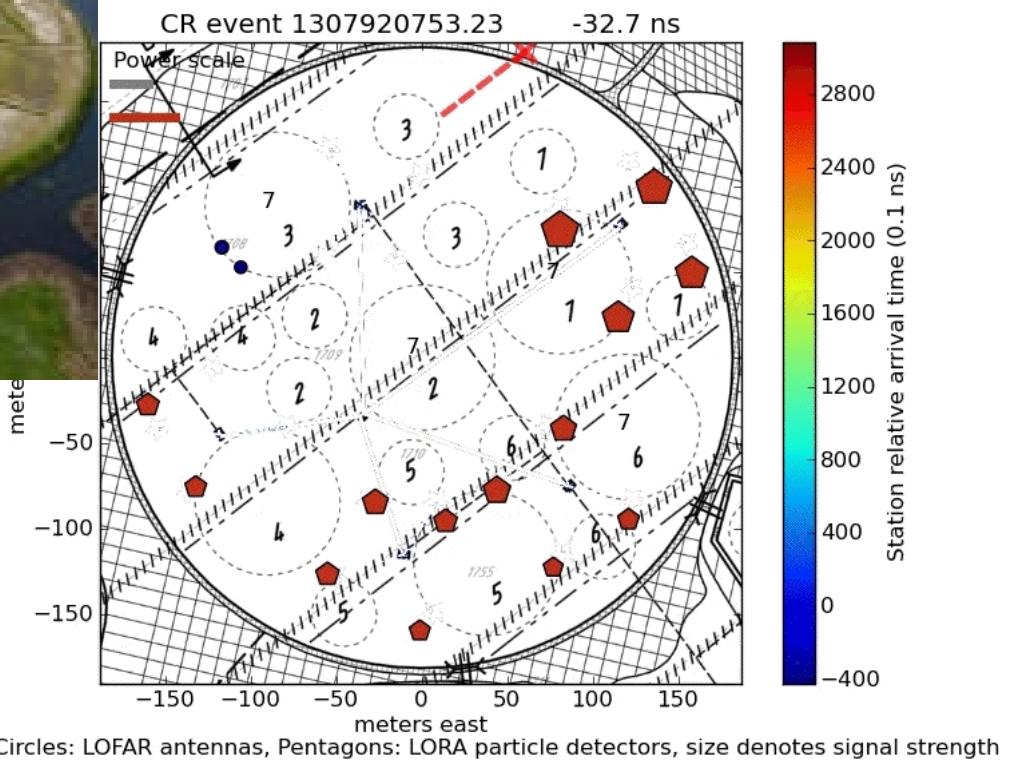
Multiple Institution Los Alamos Gamma Ray Observatory





LOFAR

Low Frequency Array



LORA - LOFAR Radboud Air Shower Array

Summary

