



Results from MAGIC and future projects

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MAGIC-Collaboration

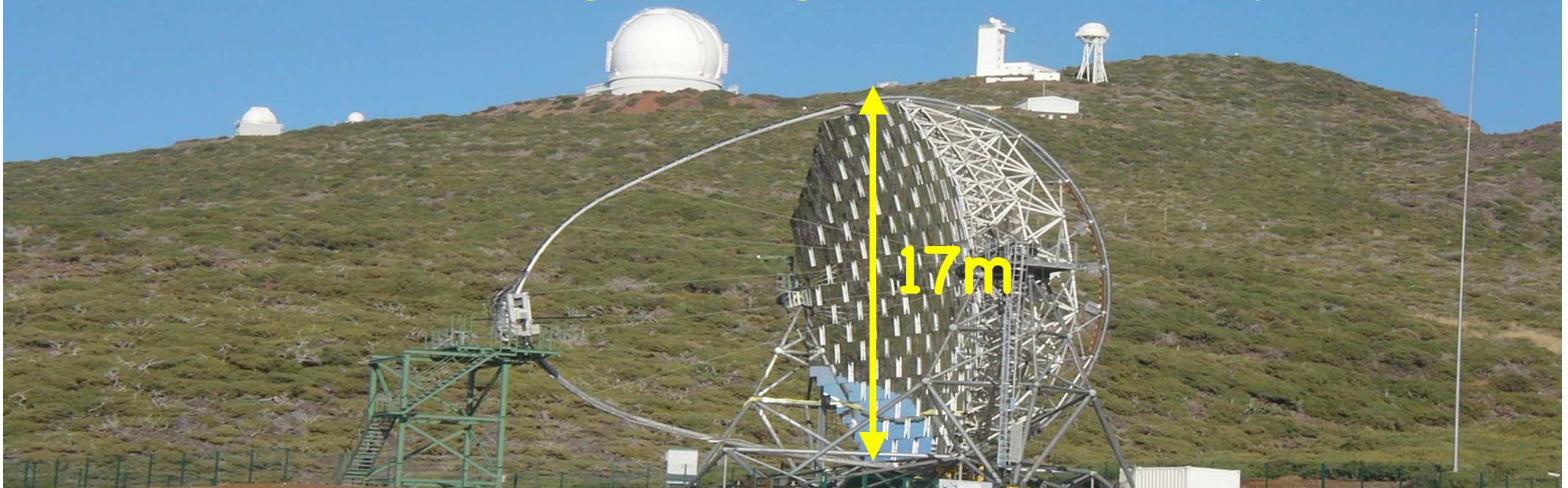
CHIPP 2008

EPFL, Sept. 9.



MAGIC Status

Major Atmospheric Gamma-ray Imaging Cherenkov Telescope, La Palma, Canary Islands;
to measure Very High Energy (VHE) cosmic photons



Physics Topics:

Galactic and Extra-galactic VHE Astronomy; Cosmology;
Origin of Cosmic Rays; Dark Matter; Quantum Gravity; ...

Past 12 month:

- no (significant) hardware problems;
smooth operation
- 14 refereed articles published or accepted
(mainly detections or important upper limits)
- 4 articles submitted
- Several more in preparation

Two highlights:

MAGIC: Detection of Crab Pulsar

Very first detection of pulsed emission from a pulsar (Crab) [thanks to effort of a small team],
see Michael Rissi, CHIPP-Prize 2008

- Breakthrough in understanding of pulsars

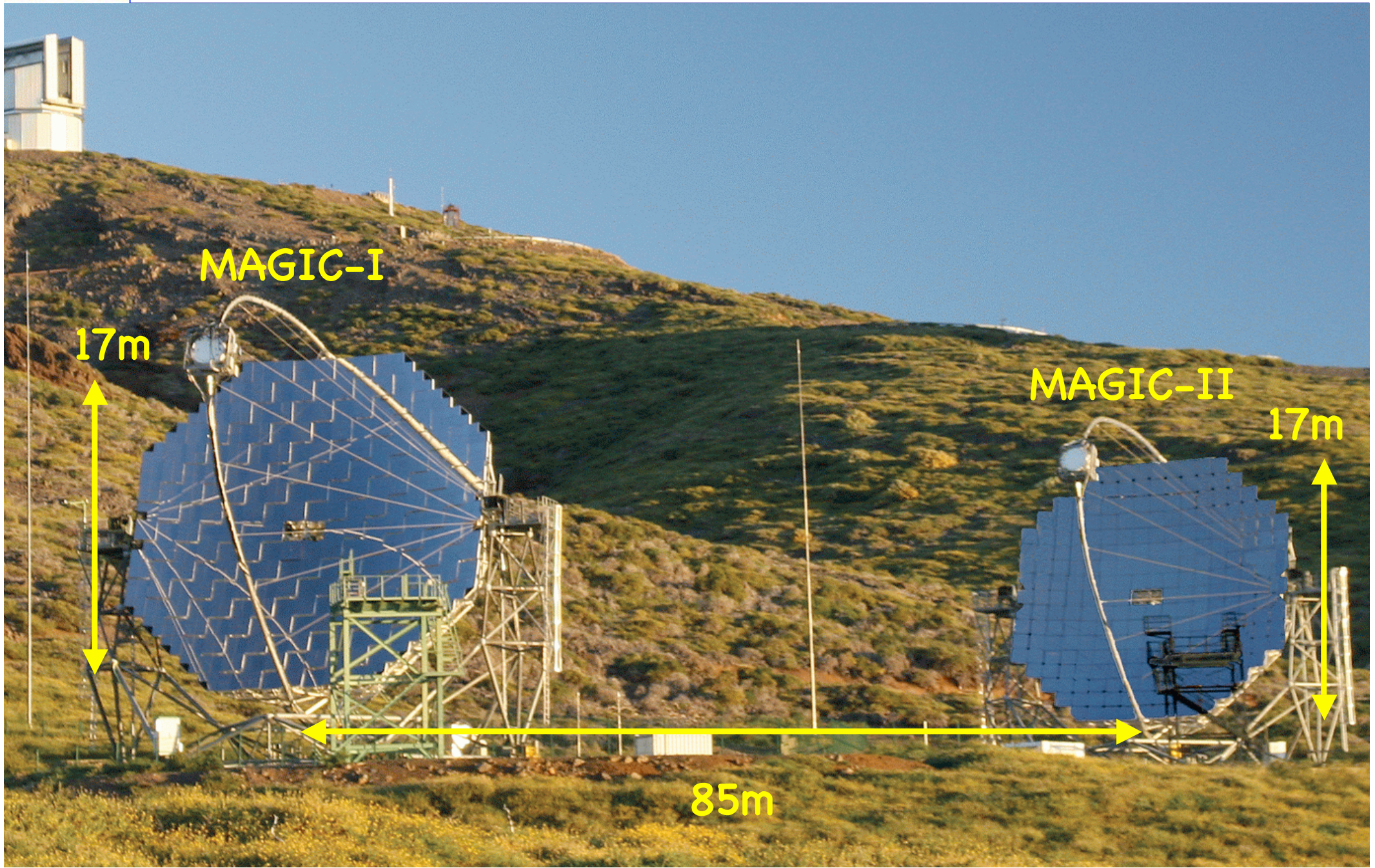
- Will allow to do cross-calibration with
Fermi GLAST satellite ==> first absolute energy
calibration of a Cherenkov telescope !!!
(crucial if e.g. DM signal found...)

Detection of VHE emission from 3c279:

- new astrophysical class of VHE emitters (FSRQ)
==> **extragalactic VHE sky richer than expected**
(FSRQ much more abundant AGN class than HBL)
- more than factor 2 further away than any other known VHE source ($>5 \times 10^9$ lightyears)
==> universe more transparent for VHE than expected:
 $\gamma_{\text{VHE}} + \gamma_{\text{IR}} \text{ ---> } e^+ e^-$
==> **less extragalactic IR light than expected**
(redshifted light from early stars/galaxies/dust/...)
==> important info for cosmology)



MAGIC: Next Steps



MAGIC: Next Steps

2nd Telescope: (construction almost finished)

==> allow for stereo observation of showers

==> better γ /hadron separation (less BG)

==> gain \sim factor 2 in sensitivity

(ETH hardware contribution:

Active Mirror Control System;

Team to help mirror mounting)

Inauguration:

19.Sept. 2008

(need some months of comissioning)

Beyond MAGIC:



Beyond MAGIC:



Beyond MAGIC: DWARF

(Dedicated multiWavelength Agn Research Facility)
Refurbish small HEGRA-CT3 Telescope to
monitor long-term behaviour of the brightest
(northern) AGNs (Würzburg, Dortmund, INFN, ETHZ):

- important (astro-)physical topic
(but large telescopes too valuable for this)
- trigger large telescopes & multiwavelength
campaigns in case of sudden bright flares
(short, bright flares give best QG information)

Prototype for world-wide grid of small
robotic(!) Cherenkov telescopes

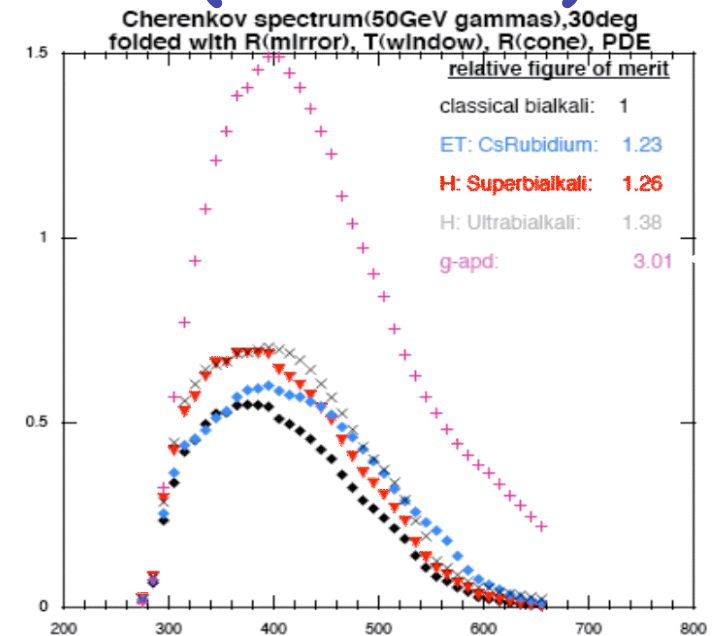
Major problem for all Cherenkov Telescopes:
Limited quantum efficiency of PMTs (25–30%)

First G-APD Camera Test:

Construction of first G-APD based camera for HEGRA-CT3

(ETHZ, PSI, UZH, UGe, EPFL):

- improved quantum efficiency (x2)
- R&D; test for future telescopes
- significantly lower E-threshold for DWARF
=> higher sensitivity; better physics



(Goal: physics data-taking in 2010)

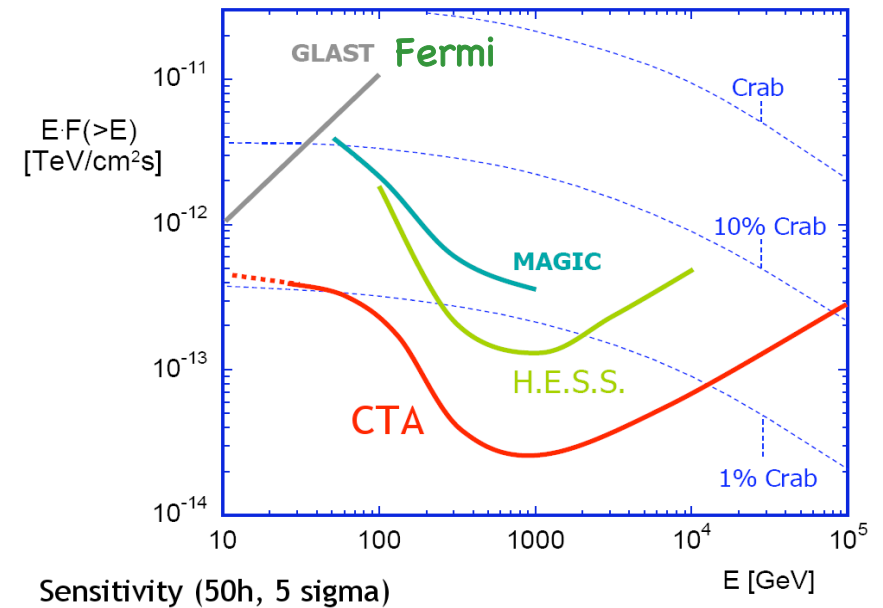
Cherenkov Telescope Array:
Pan-european effort for
next generation (open)
Cherenkov observatory

**Goal: compared to today,
improve sensitivity x10
and significantly extend energy range**

Design study phase:

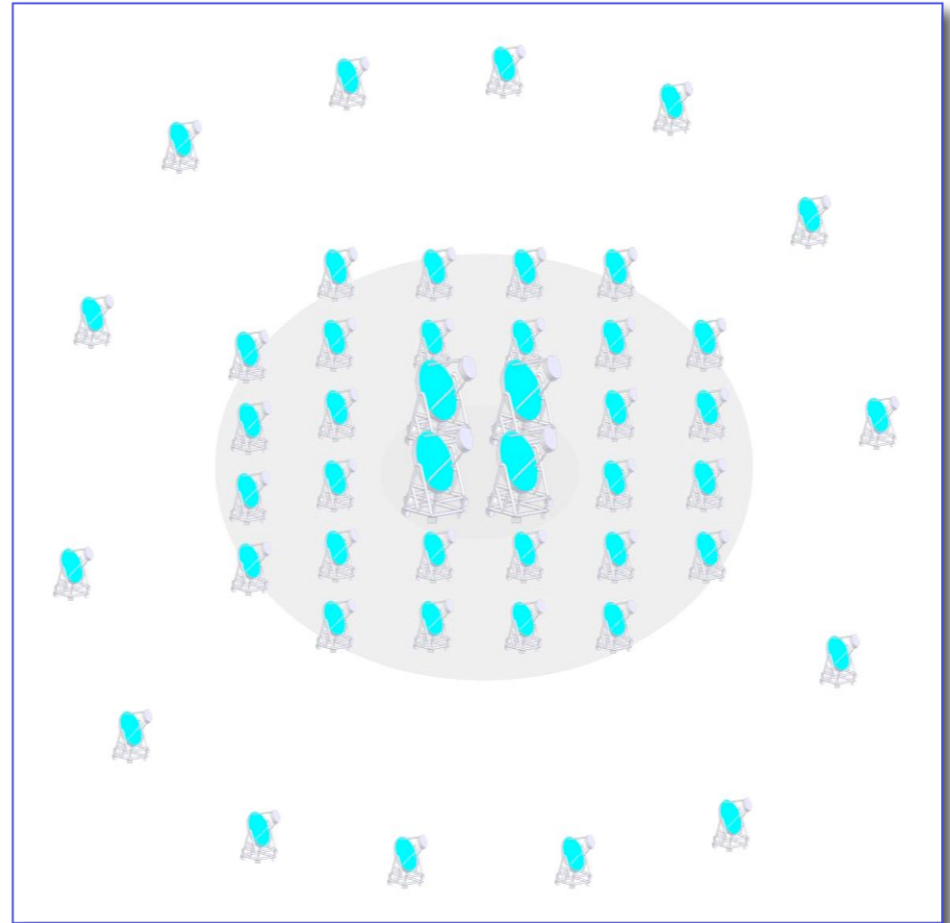
Active swiss participation in all working groups:

Physics: UGe, ETHZ; MC: UGe; Site: ETHZ;
Software: UGe, ETHZ; Telescope: UZH, ETHZ;
Camera&Electronics: ETHZ, UZH, UGe, PSI



European roadmaps:

- Top priority project in ApPEC/ASPERA
- High priority in Astronet
- under discussion in ESFRI



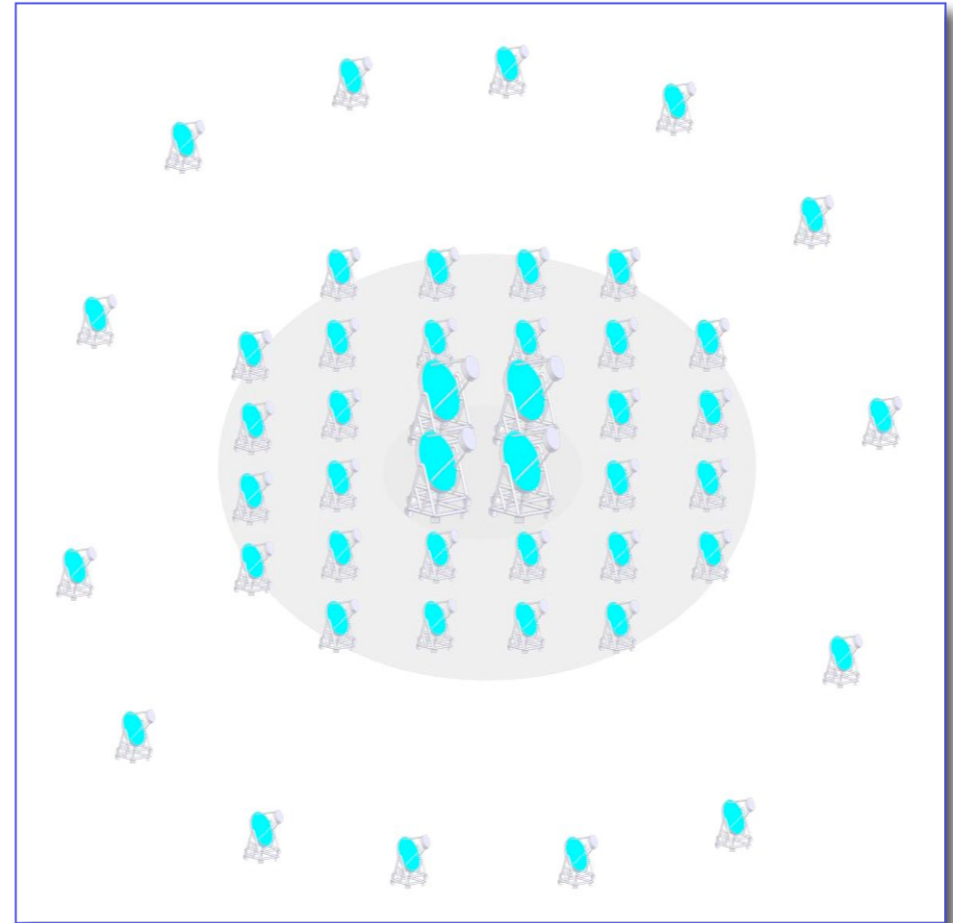
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Next open meeting:

Nov. 3.-5. 2008, Padova

http://www.cta-observatory.org/CTA_padova_2008.html



everybody wellcome ...