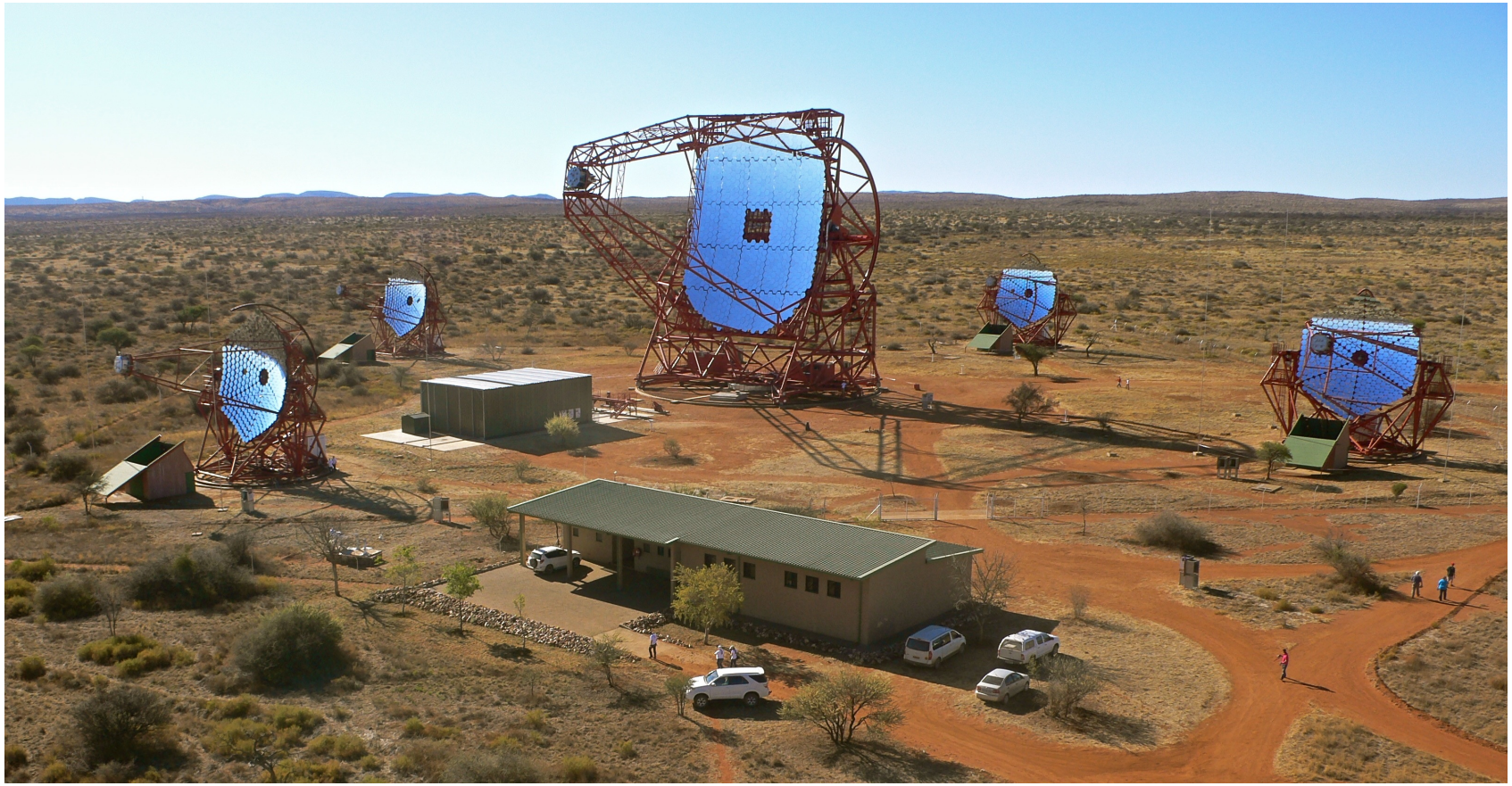
LAPP
Laboratoire d'Annecy-le-Vieux
de Physique des Particules

Activités du groupe HESS/CTA

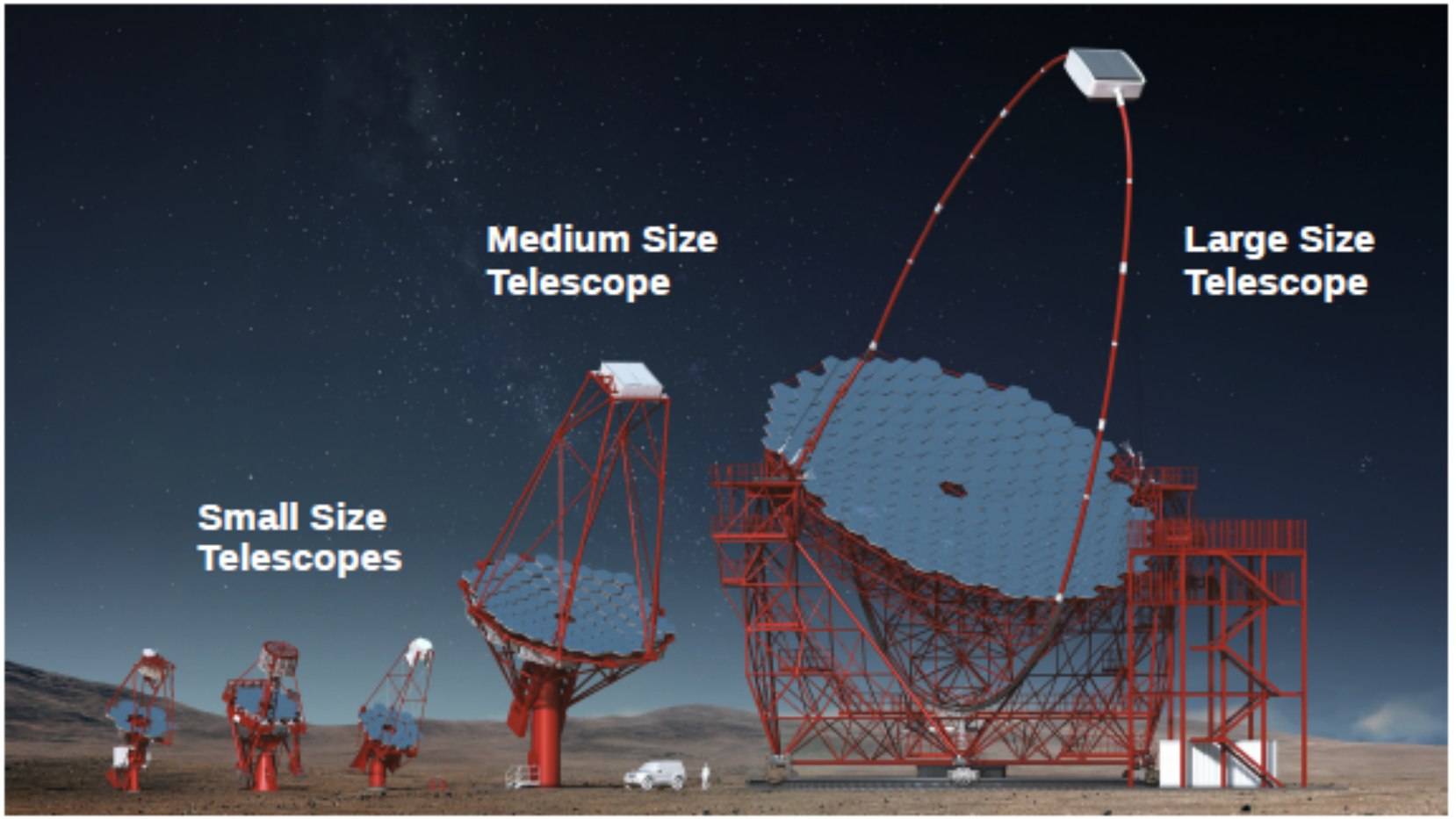
cnrs
UNIVERSITÉ
SAVOIE
MONT BLANC

HESS



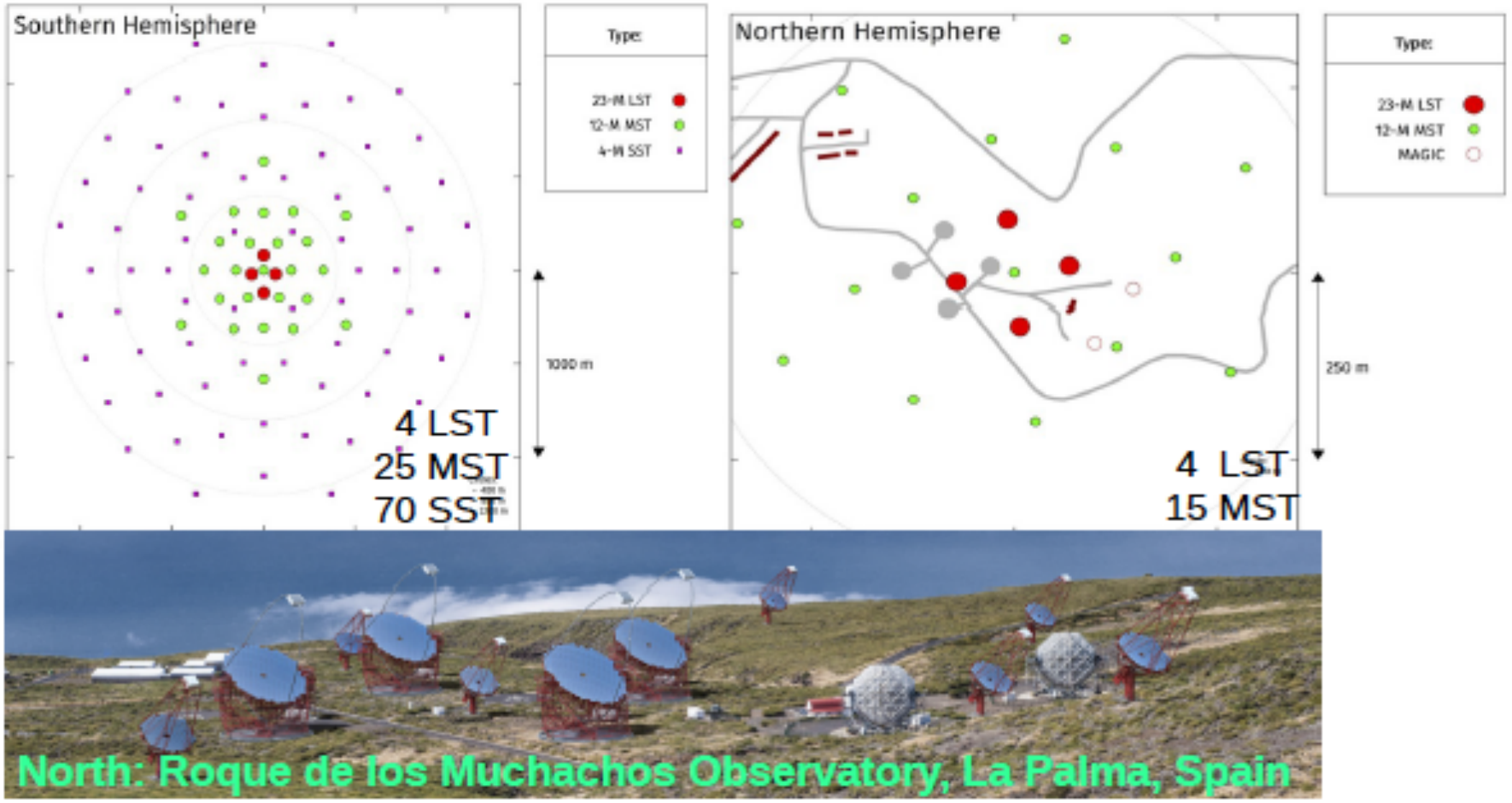
Fonctionne depuis 2004 avec 4 « petits » et depuis 2012 avec le 5eme grand télescope
Fonctionnement jusqu'en 2019. Discussion en cours pour un prolongement.

CTA - les instruments

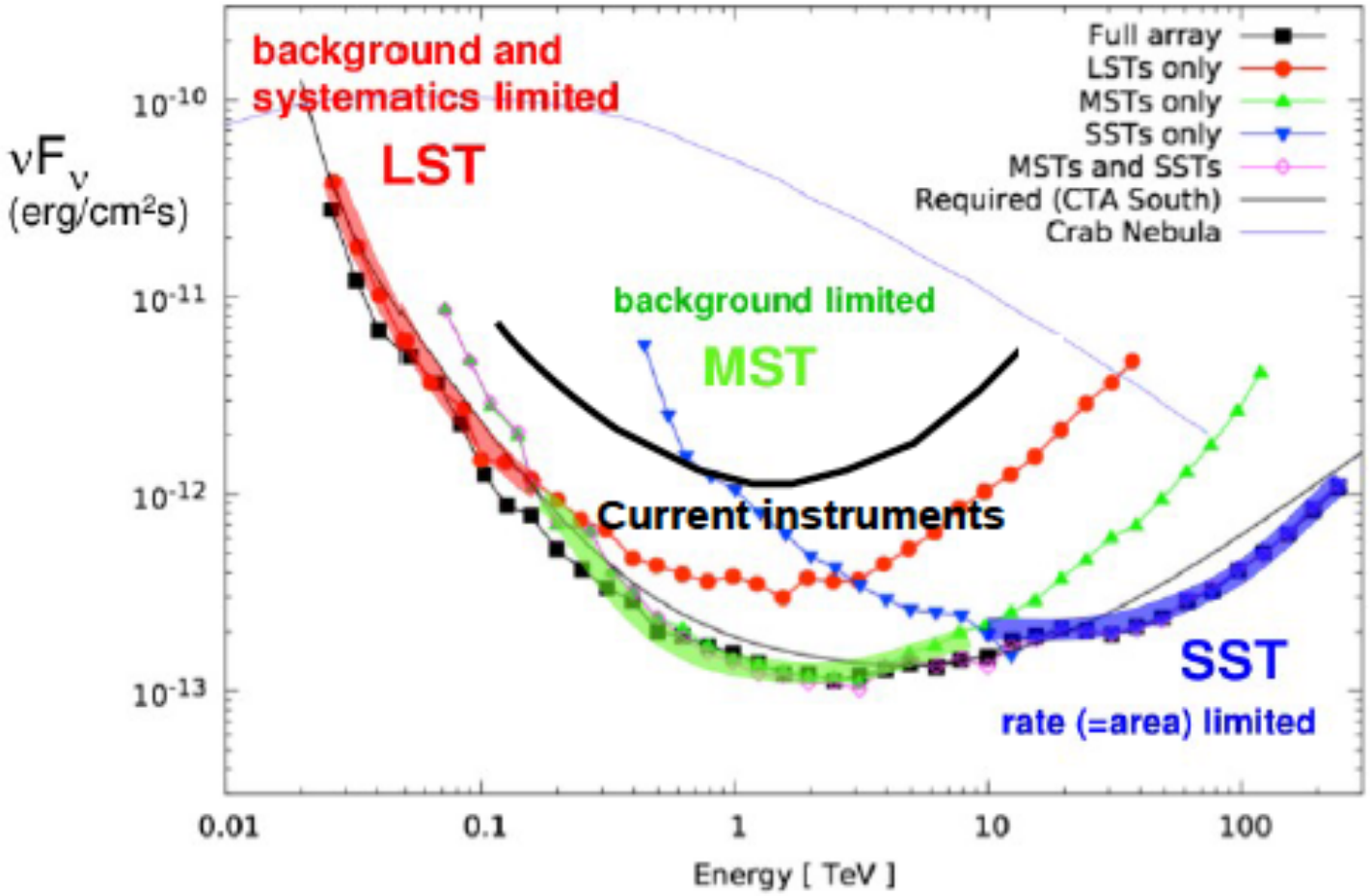


Three different sizes of telescope optimized for three different energy ranges 11

CTA – 2 sites


Southern Hemisphere
Type:
23-M LST
12-M MST
4-M SST
1000 m
4 LST
25 MST
70 SST
Northern Hemisphere
Type:
23-M LST
12-M MST
MAGIC
250 m
4 LST
15 MST
North: Roque de los Muchachos Observatory, La Palma, Spain

CTA - sensibilité



CTA - LST

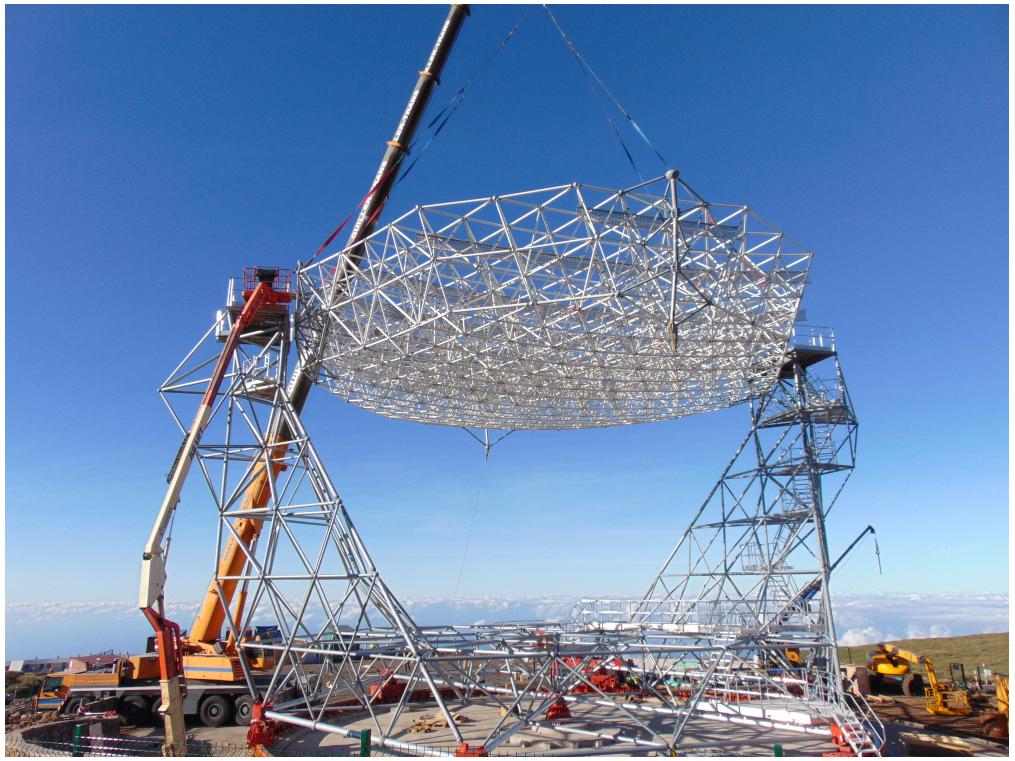
Grands télescopes de CTA (4 par site)

- 24m de diamètre

⇒ Sensible a partir de 20-30 GeV

- Structure légère

⇒ Moins de 20s pour pointer une région du ciel



Au LAPP:

- Mécanique: Arche haubanées
- Mécatronique: Drive
- Electronique: Contrôleur de camera
- Informatique: drive (+ gestion des alertes) & SW de contrôle du télescope

Première lumière du LST1 automne 2018.

3 autres attendus entre 2020 et 2023.

Le LAPP est responsable des plusieurs éléments critiques pour le suivi d'alerte transients

CTA - Data

Gilles Maurin, Thomas Vuillaume, Florian Gate

Contribution majeure dans le WG Data Management de CTA

Groupe très actif dans la définition du pipeline d'analyse de CTA
⇒ Définition du framework
⇒ Introduction du calcul haute performance
⇒ Implémentation de méthodes performantes (machine learning…)

Le groupe est en très bonne position pour analyser efficacement les toutes premières données

La Physique qui nous intéresse

Galactique

SNR/MC
A. Fiasson

SFR
G. Maurin
G. Lamanna

Extragalactique

AGN – GRB et physique fondamentale (EBL…)

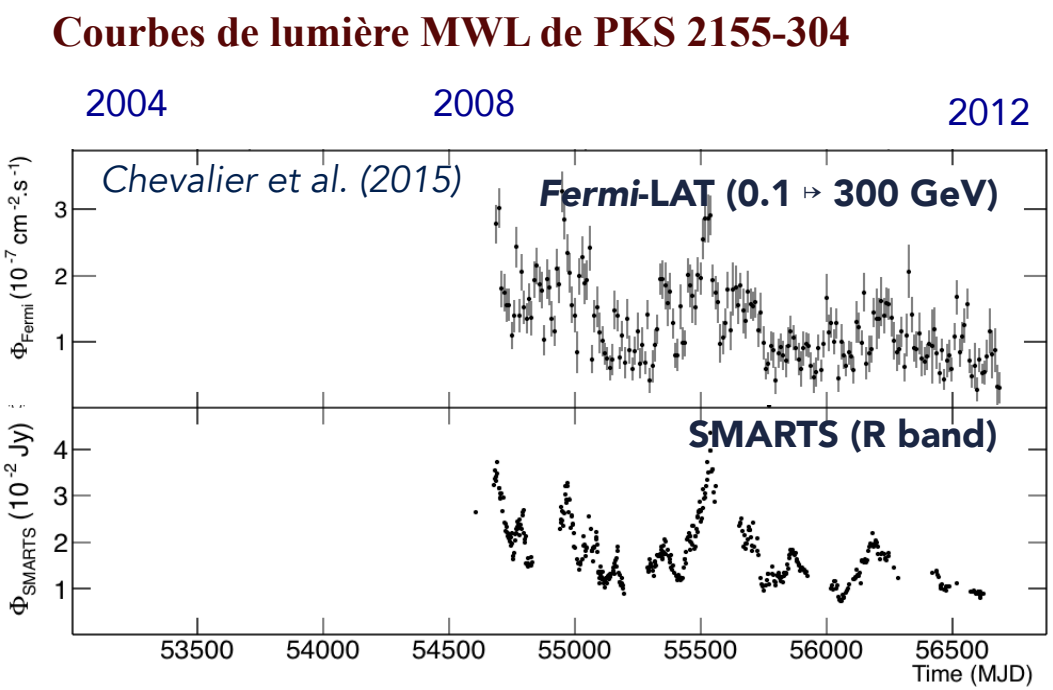
D. Sanchez (deputy convener HESS)
G. Maurin
T. Vuillaume
A. Fiasson
Q. Piel
F. Gaté
A. Carosi

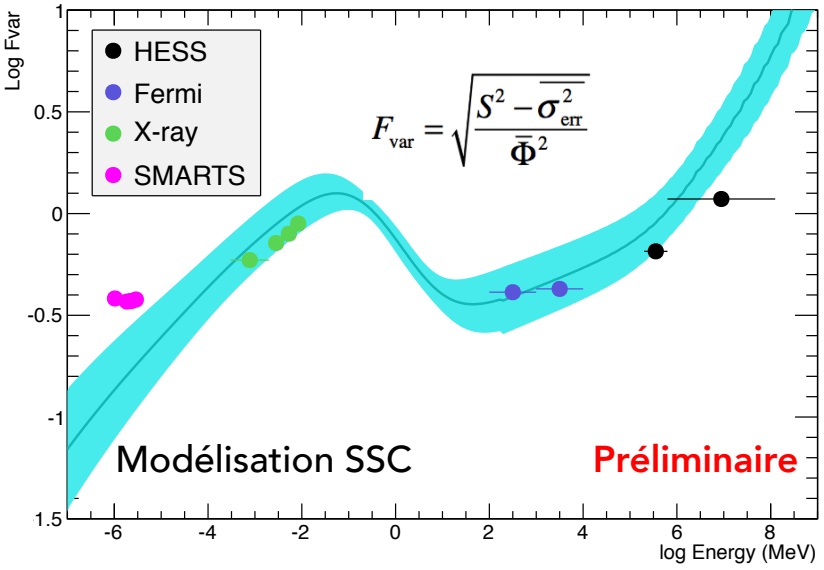
Matière noire

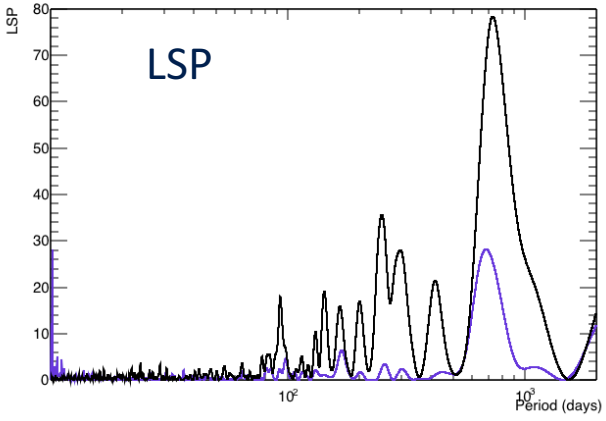
V. Poireau
C. Armand
J.P. Lees
G. Lamanna

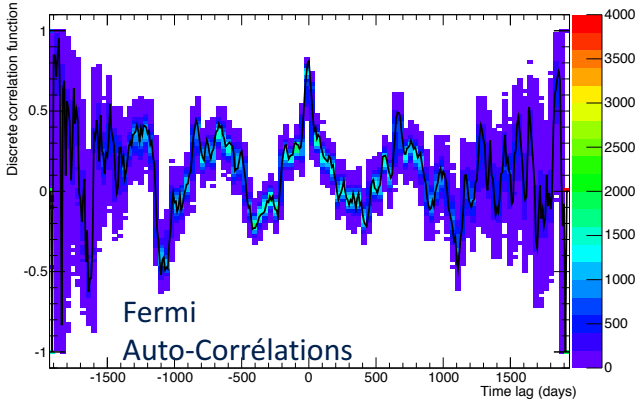
AGN - Étude des blazars et de leur variabilité

David Sanchez, Jill Chevalier



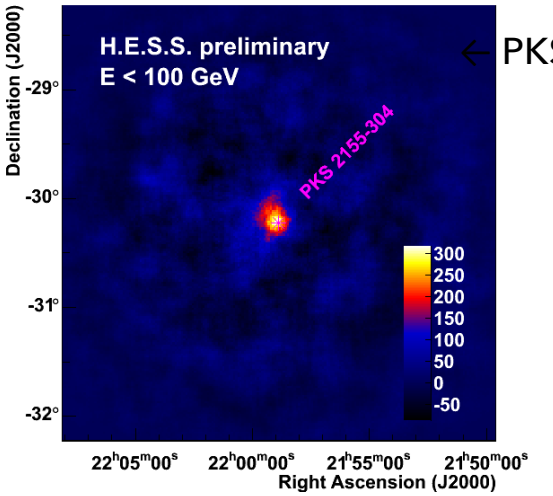






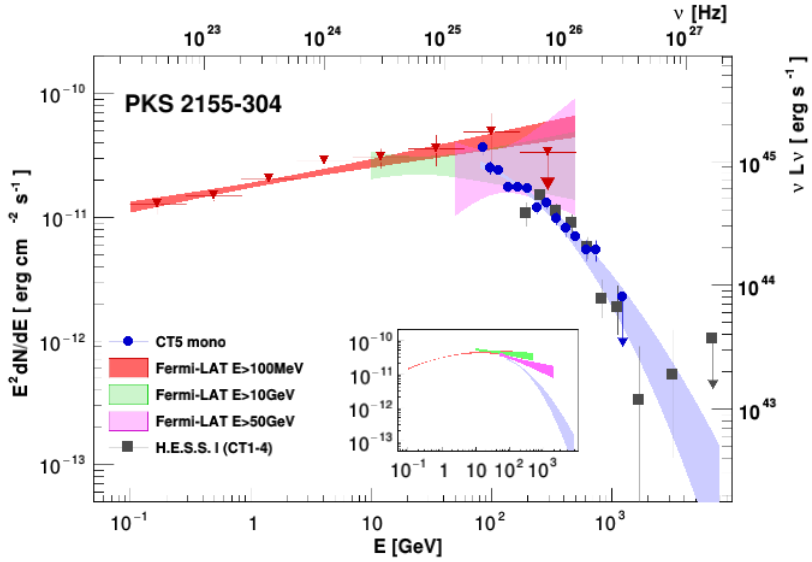
AGN – Premiers résultats H.E.S.S. II

David Sanchez

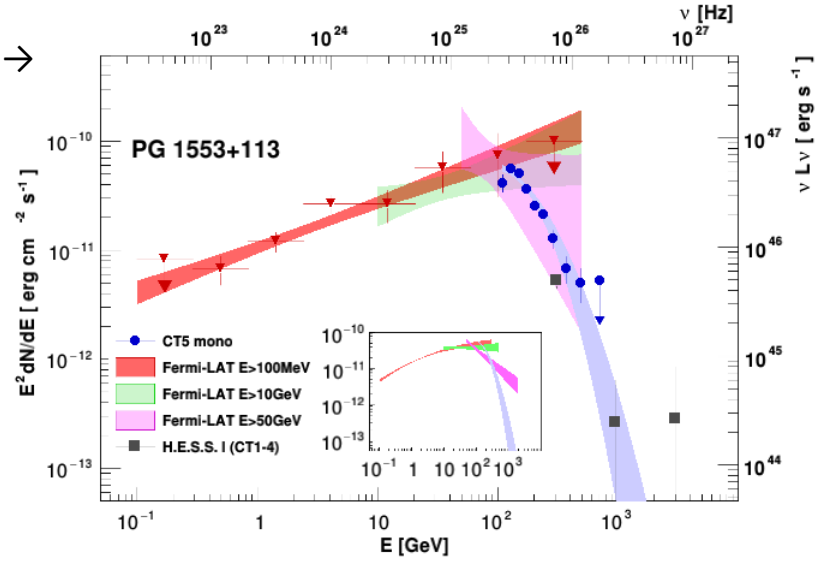


← PKS 2155-304
E < 100 GeV

PKS 2155-304 →
2013-2014



PG 1553+113 →
2013



- Premiers résultats H.E.S.S. II sur les AGN
- Papier soumis

GRB - H.E.S.S.

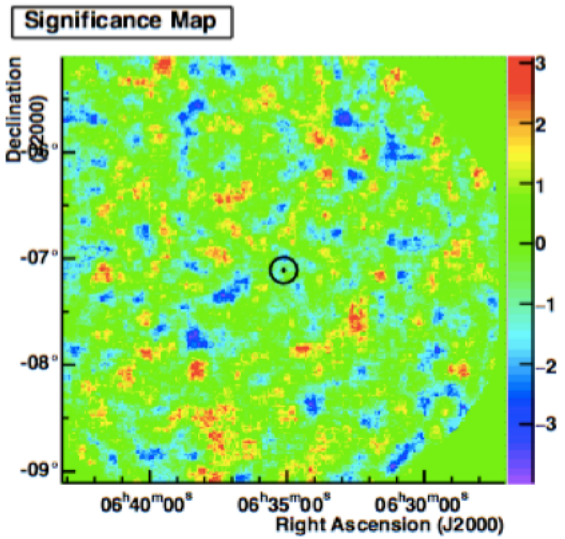
Quentin Piel, Alessandro Carosi & Armand Fiasson

- (Re)analysis of GRB observed since 2012

  35 GRB observations made by H.E.S.S.

  Aim

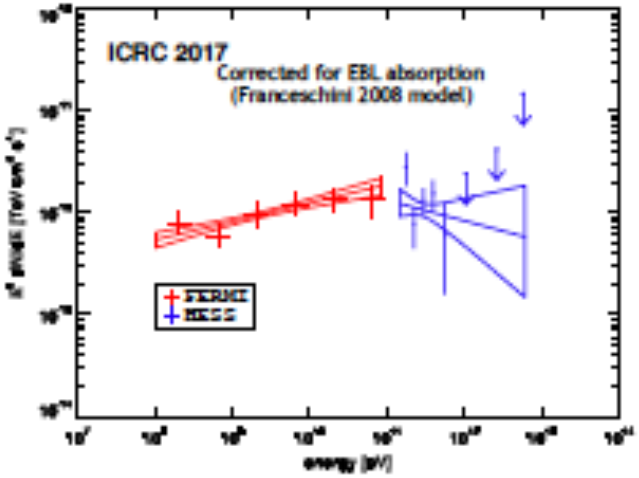
  Having a detection or a catalog of upper limits

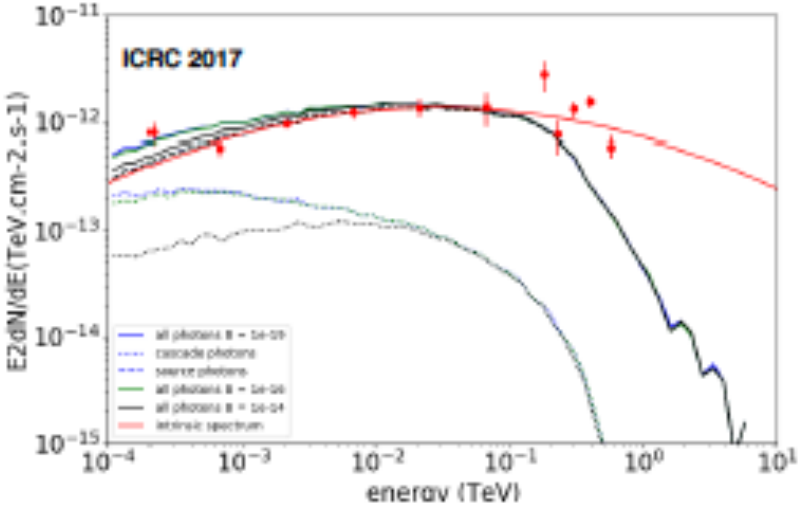


- PI of the GRB observation program of 2018

  In charge of the proposal writting and GRB experts

- HESS activities: propagation task force (Gaté, Sanchez)
  - Study observed spectra modification for IGMF assumption with HESS sources.
  - Constrain superior limit on IGMF

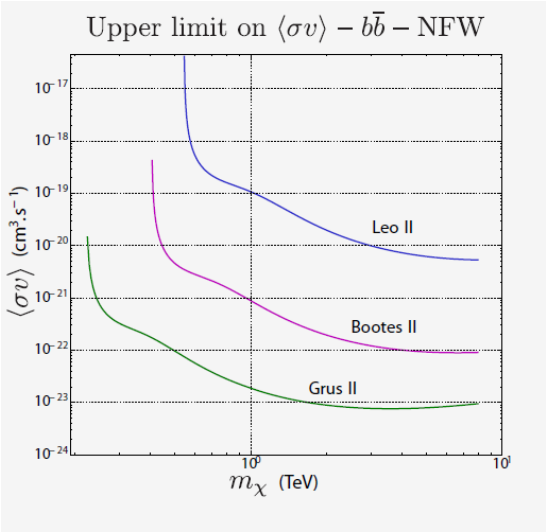




  - Study ongoing on large number of sources
  - Proposal for high opacity sources of interest

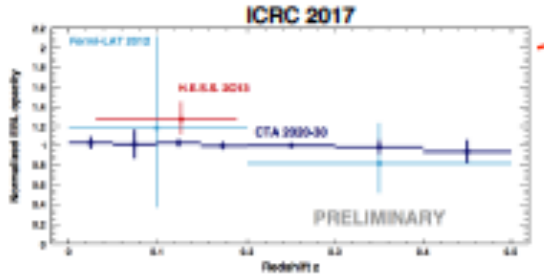
DARK MATTER

- Group for indirect dark matter search using HESS
  - Vincent Poireau, Céline Armand, Jean-Pierre Lees, Francesca Calore (LAPTh)
  - Céline : thesis 2017-2020, 80 % theoretical work, 20 % experimental work
- Indirect search for dark matter with gamma rays using DM rich regions
- Dwarf spheroidal galaxies
  - Three dwarves observed in 2016 already analyzed
  - Analysing now 2017 data: three dwarves for 30 h of observation
  - Proposal for 2018 for 70 h of observation
- Irregular galaxies
  - Proposal for 2018 for 30 h of observation

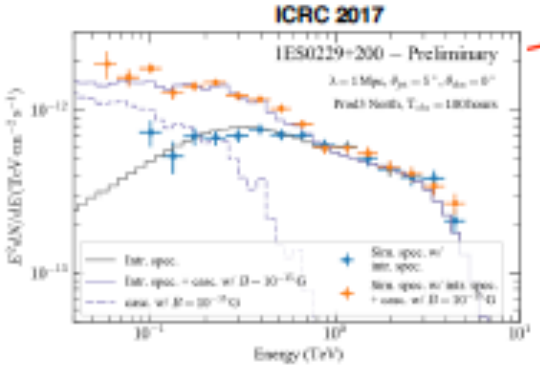


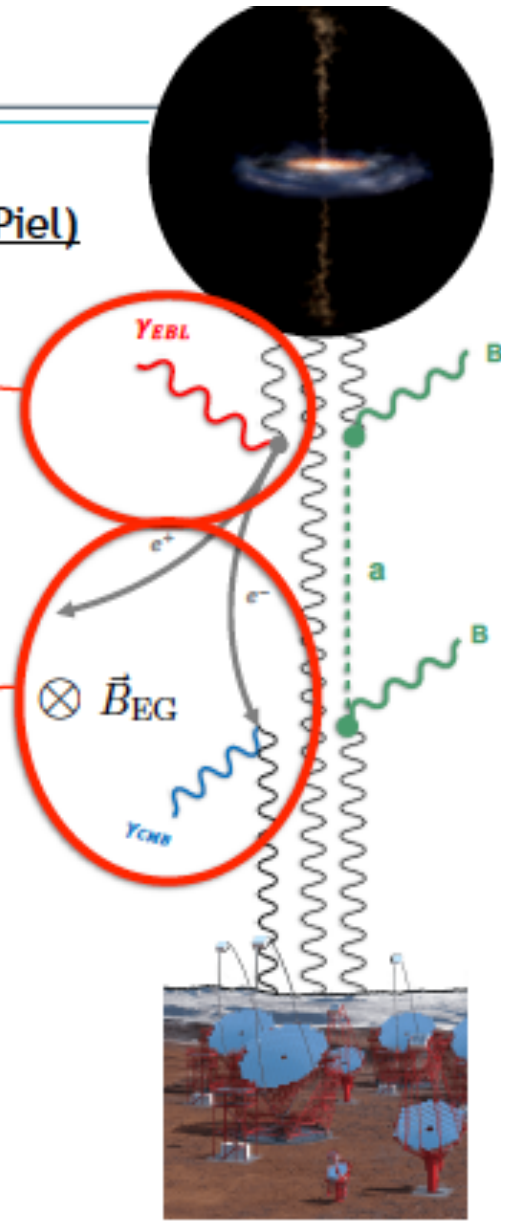
- CTA activities: propagation task force (Gaté, Sanchez, Piel)

  - Constrain Extragalactic Background Light opacity



  - Probe extragalactic magnetic fields





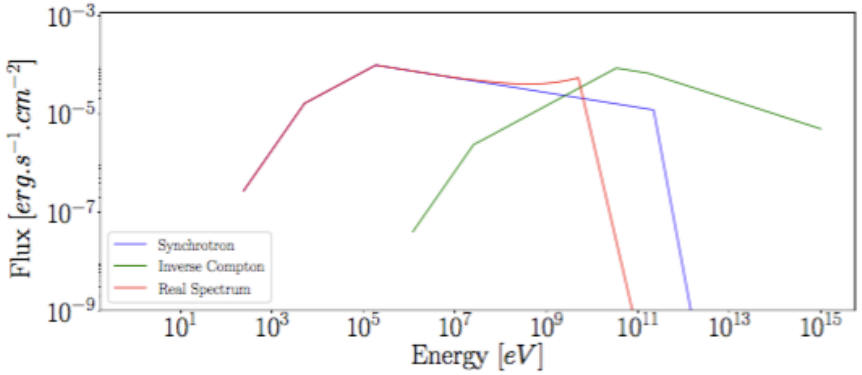
  - Sources simulation: CTA IRFs, layout, …
  - CTA capabilities to probe IGMF, EBL…

GRB - CTA

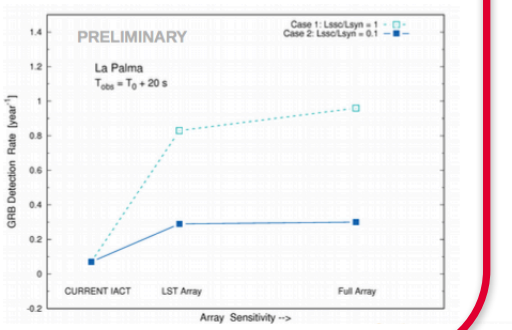
Quentin Piel, Alessandro Carosi & Armand Fiasson

Simulation of Gamma-Ray Bursts

Prompt and Afterglow phases
(simple Synchrotron+SSC processes)



GRB detection rate prediction with CTA



GRB detection for different set of physical parameters