

Résumé des conférences d'hiver

Astroparticules

What will NOT be in this summary:

- Planck results
- AMS results

Cosmic Rays

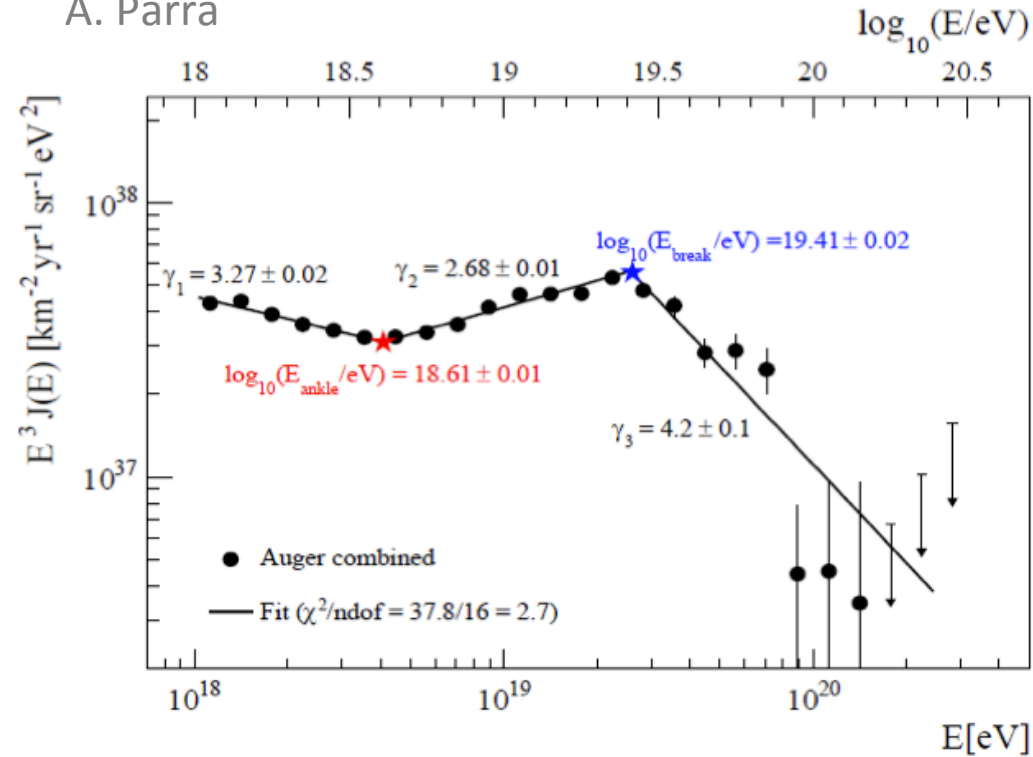
Results from:

- Pierre Auger Observatory (Argentina)
- Telescope Array (Utah, USA)

Spectrum of UHECRs

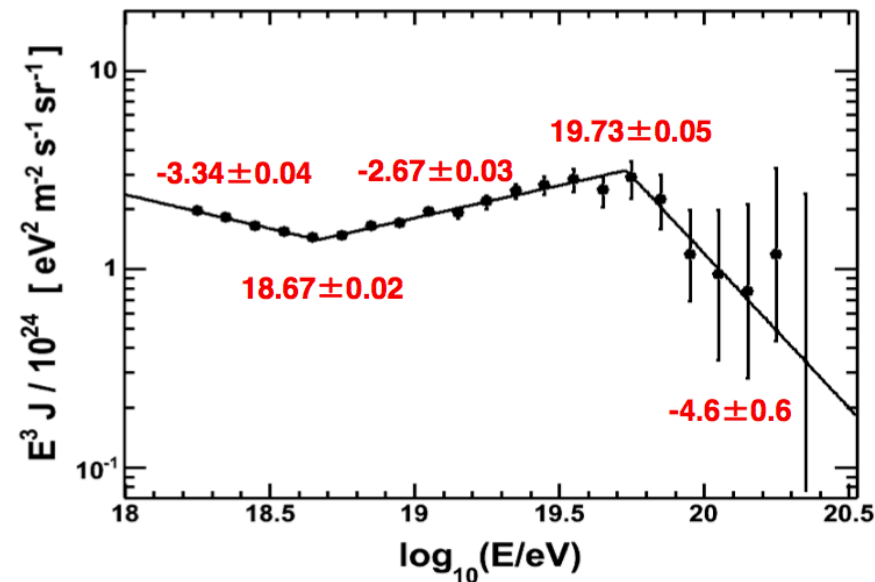
Auger

A. Parra



Telescope Array

N. Sakurai



Significance of
GZK cut-off:

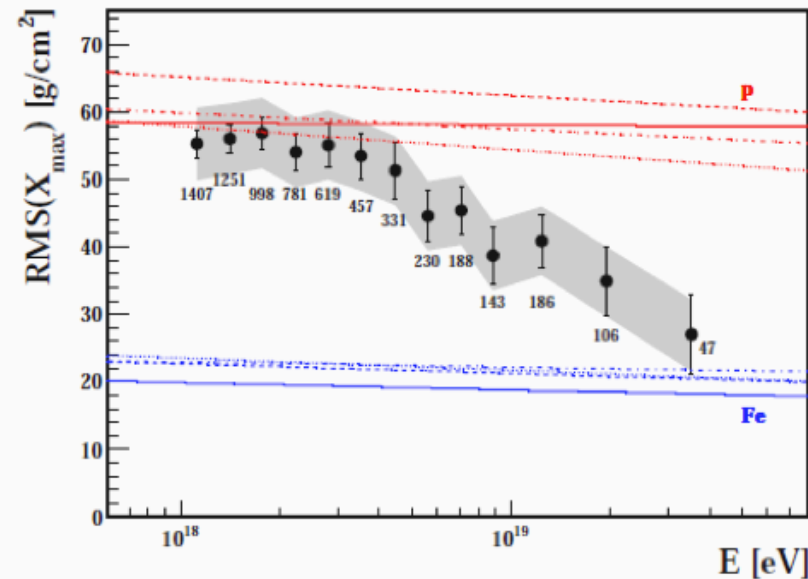
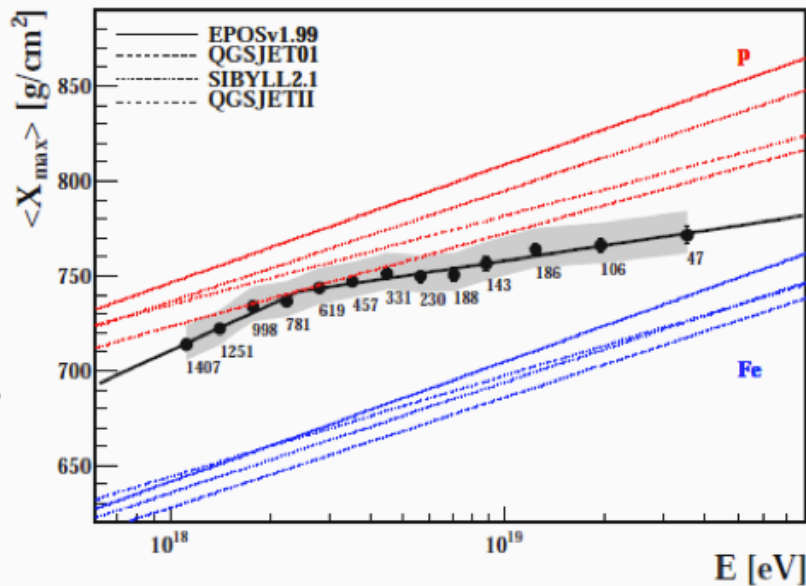
$> 20 \sigma$

5.6σ

Composition of UHECRs

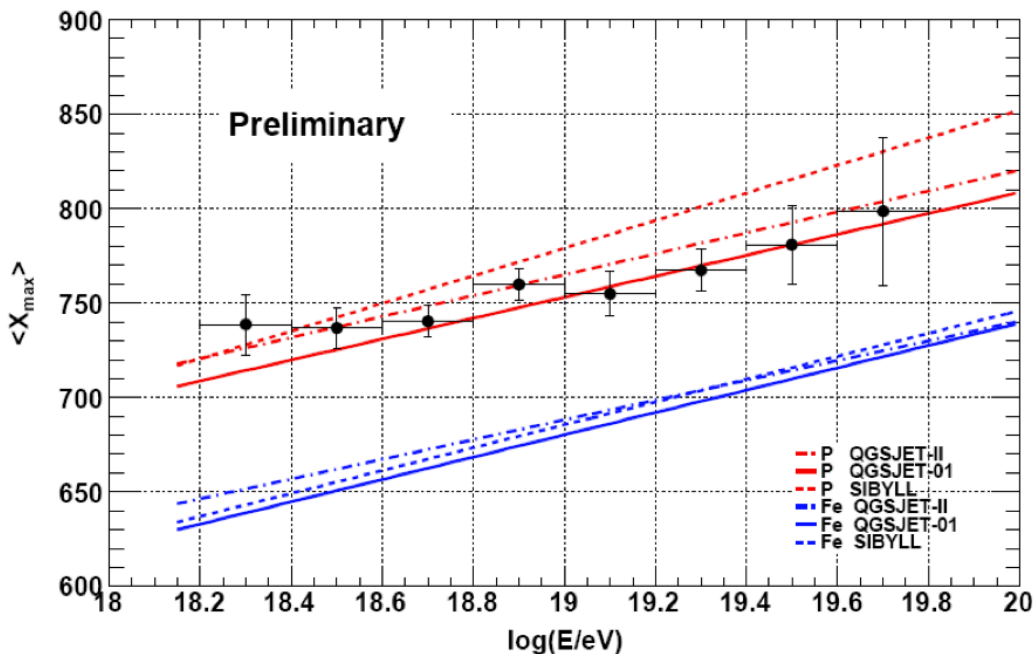
Auger

E. Santos



Telescope Array

N. Sakurai



Disagreement!

Anisotropy/Correlation

Auger:

- No update on correlation with AGNs
- Consistent with isotropy on large scales
- Improved limits on γ and ν fluxes

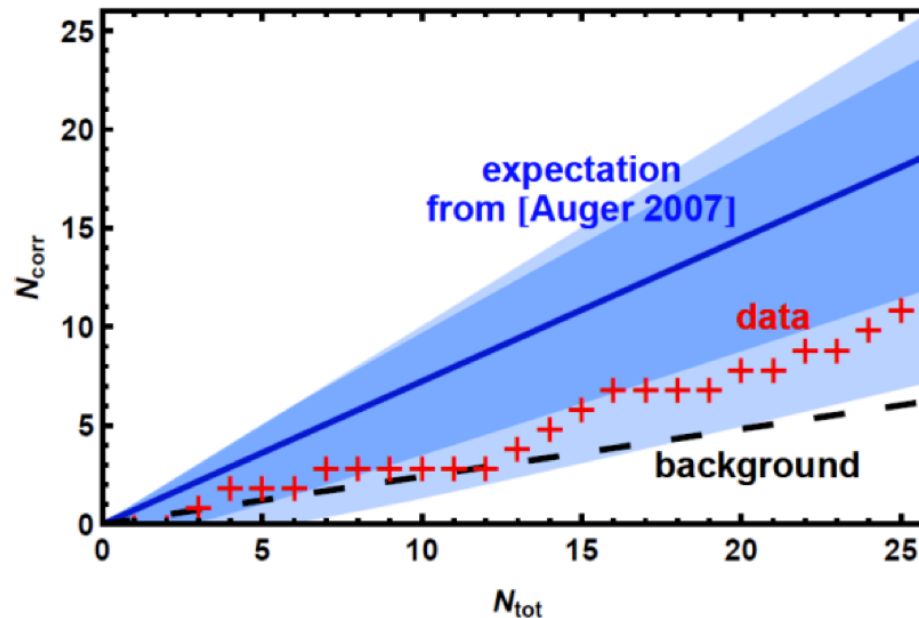
R. Gaio

M. Tartare

Telescope Array:

N. Sakurai

Correlation with AGNs ($\delta < 3^\circ$)

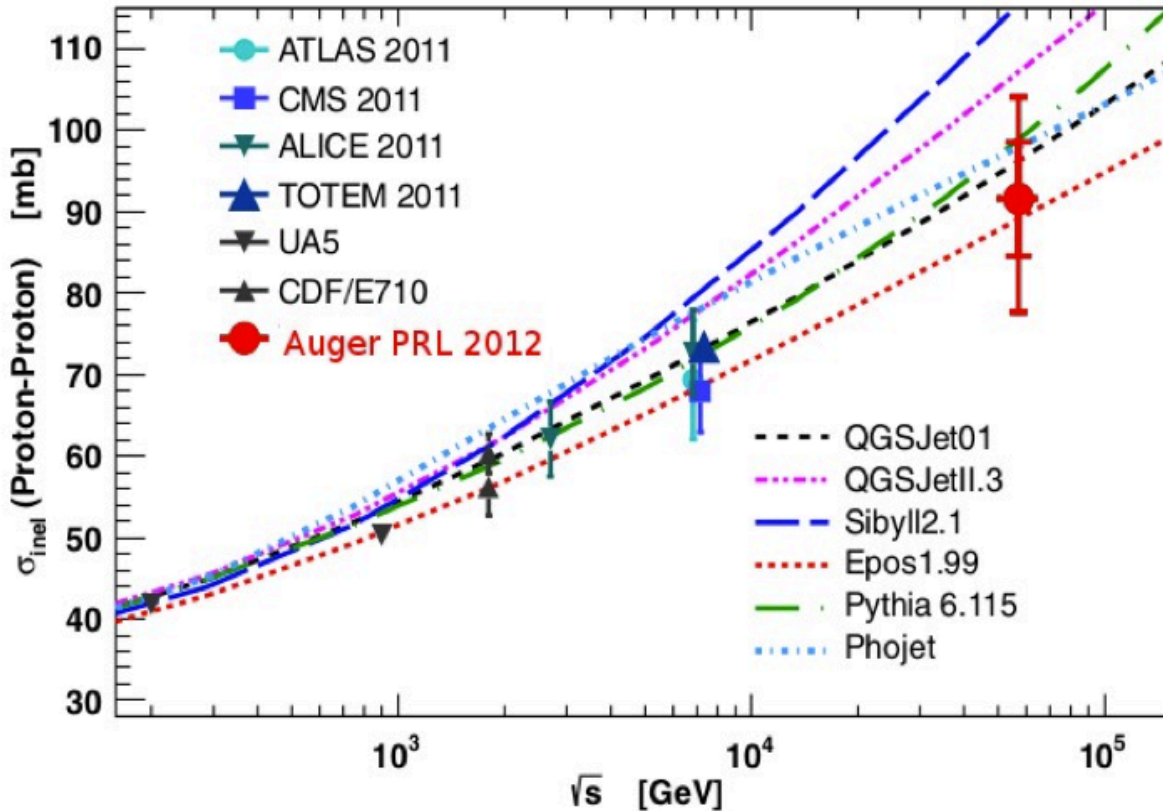


p-value : 0.02

Limits on γ and ν fluxes (not as stringent)

p-p cross section

C. Breve



comparison
with data
from
accelerators

$$\sigma_{p-p}^{inel} = [92 \pm 7_{stat} \left(\begin{smallmatrix} +9 \\ -11 \end{smallmatrix} \right)_{sys} \pm 7_{Glauber}] mb$$

$$\sqrt{s} = 57 TeV$$

+ impact of LHC data on Air Shower Development

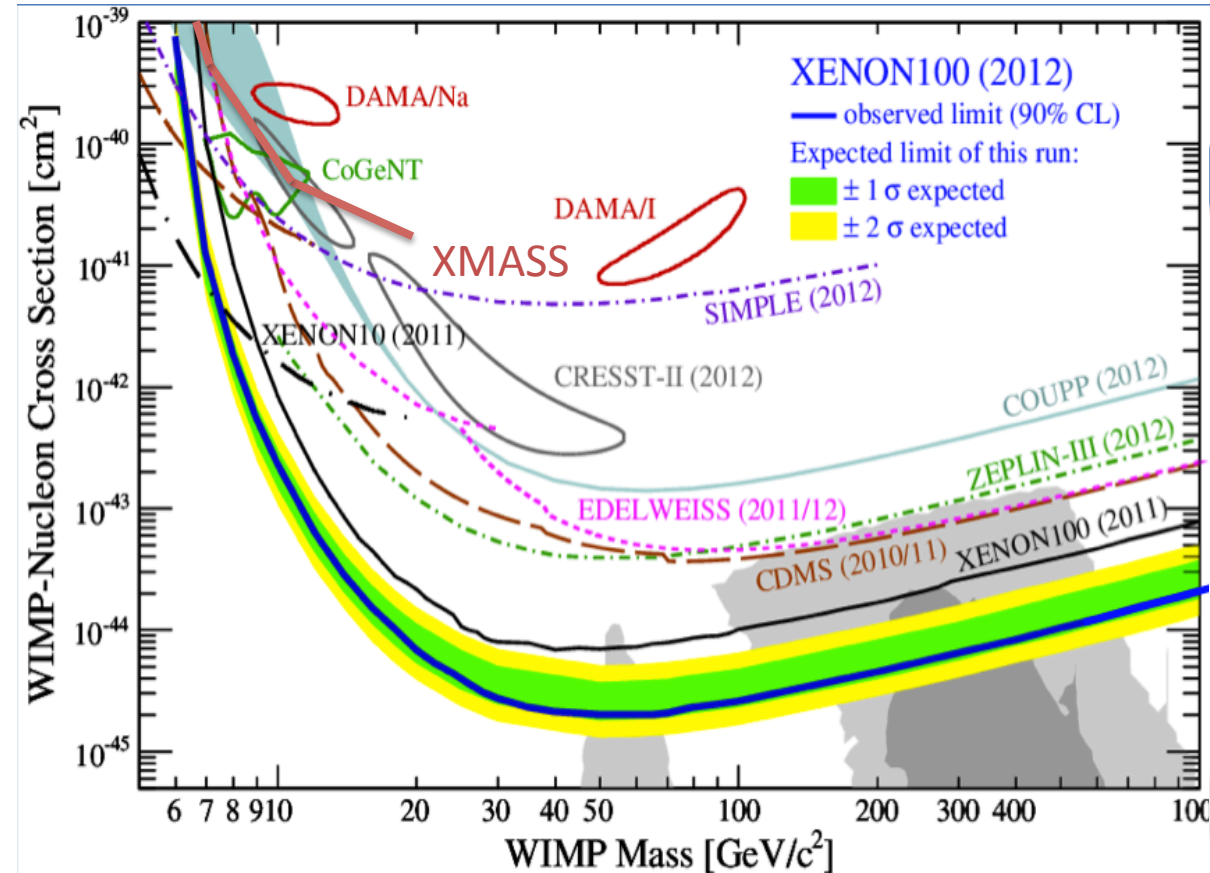
T. Pierog

Dark Matter direct search

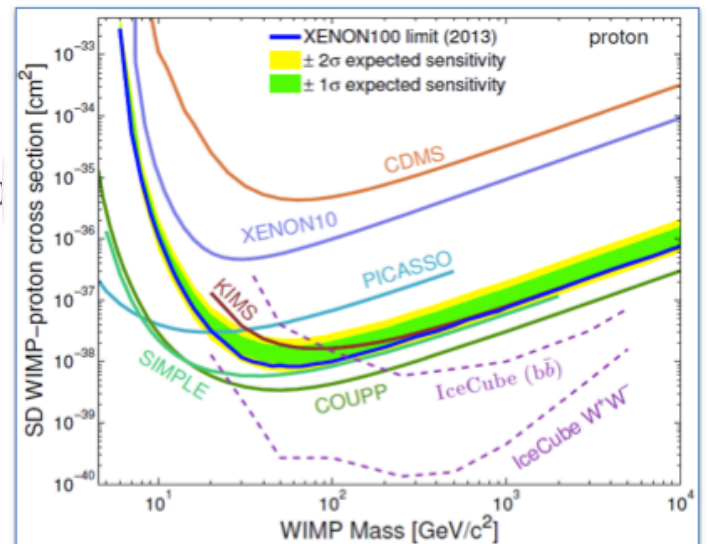
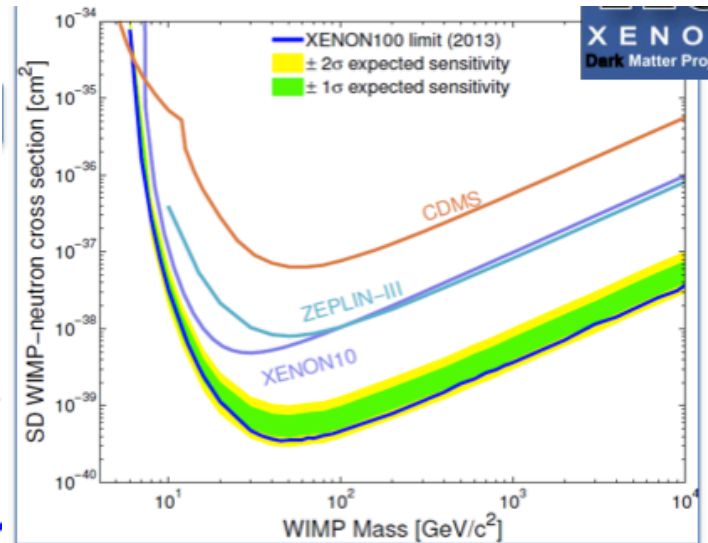
Results from:

- Xenon 100
- Edelweiss
- XMASS

WIMP – n interaction limits



M. Le Calloch (Xenon 100)
 G. Gerbier (Edelweiss)
 K. Hiraide (XMASS)

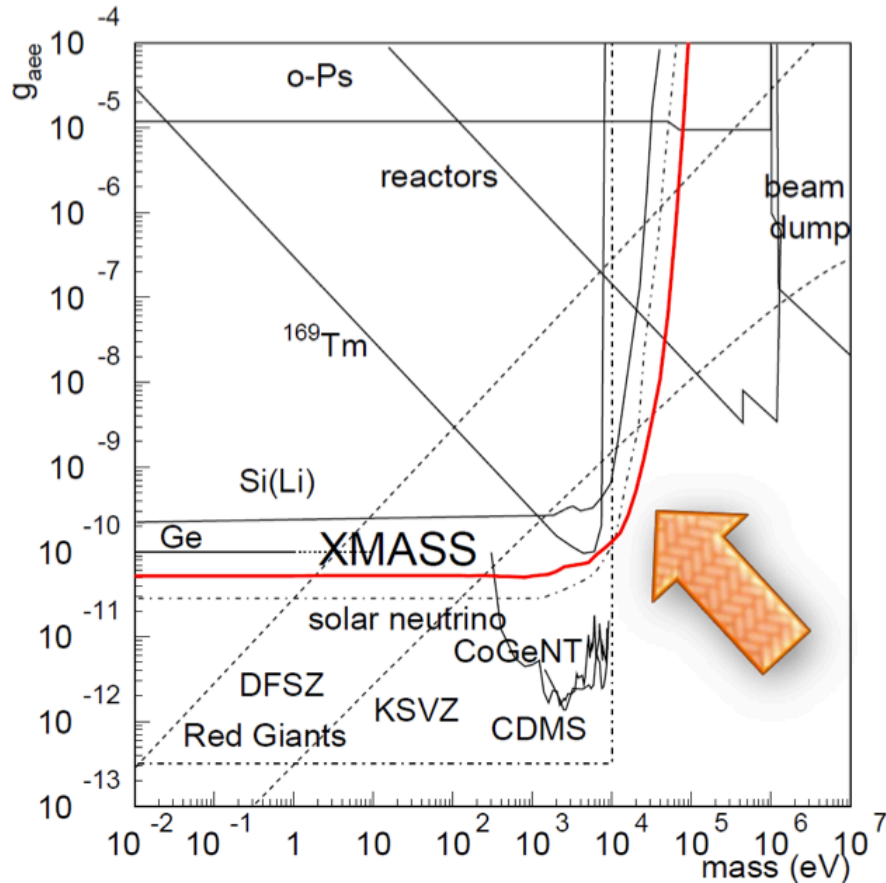


+ Spin dependent results from Xenon 100

M. Le Calloch

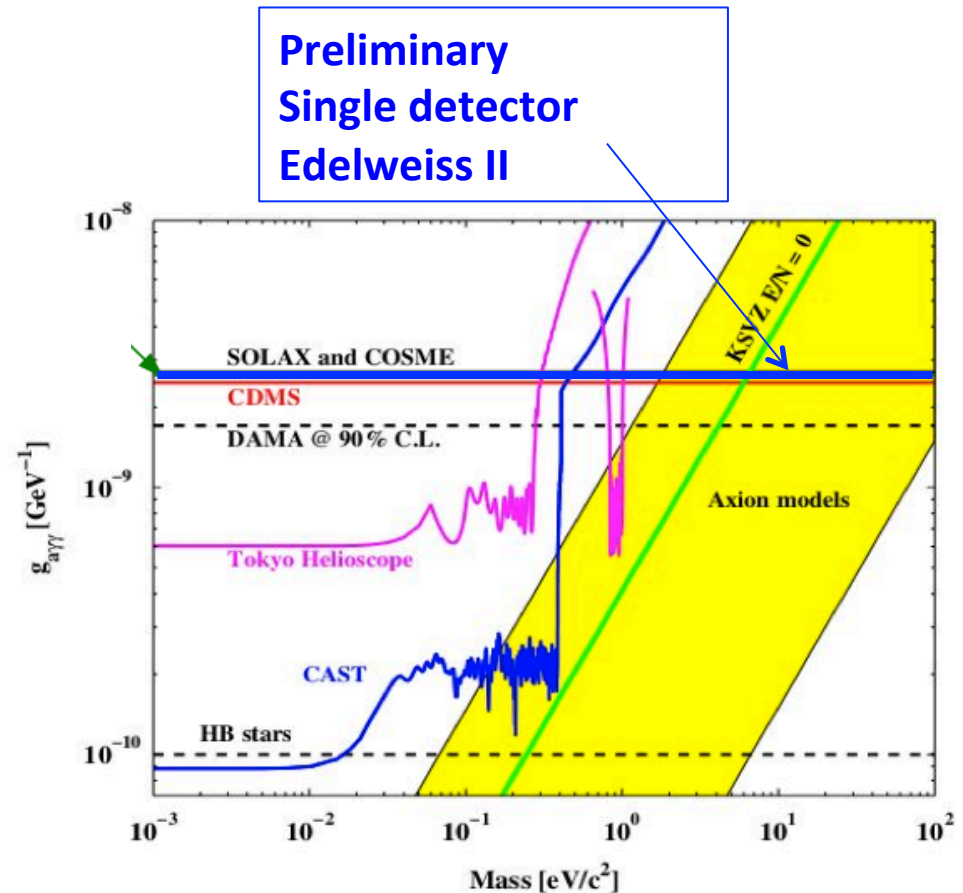
Axion-Like Particles constraints

coupling to electrons



K. Hiraide

coupling to photons



G. Gerbier

+ Constraints on low-mass ALPs with H.E.S.S.

D. Wouters

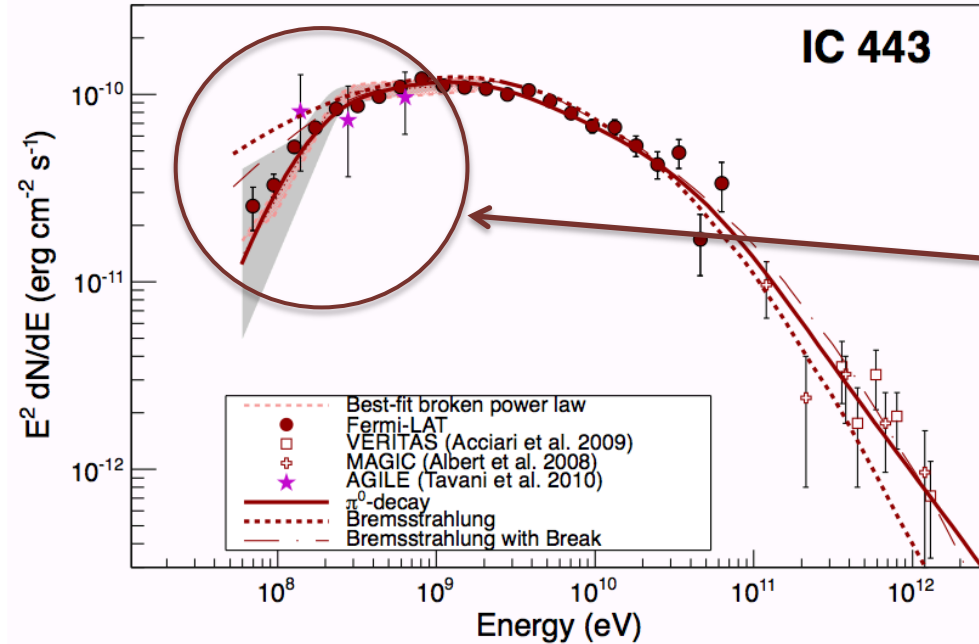
γ -ray astronomy

Results from:

- Fermi-LAT
- H.E.S.S.

Acceleration of protons in SNRs

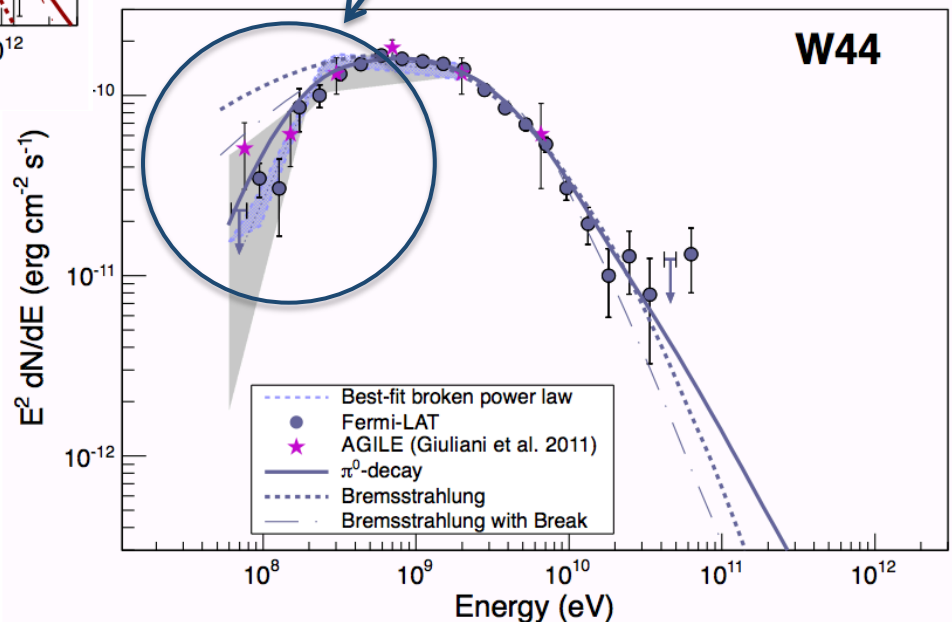
2 Supernova Remnants interacting with Molecular Clouds



Characteristic pion decay signature

Ackermann et al. *Science* 2013
Fermi-LAT Collaboration

Evidence for protons
acceleration in SNRs

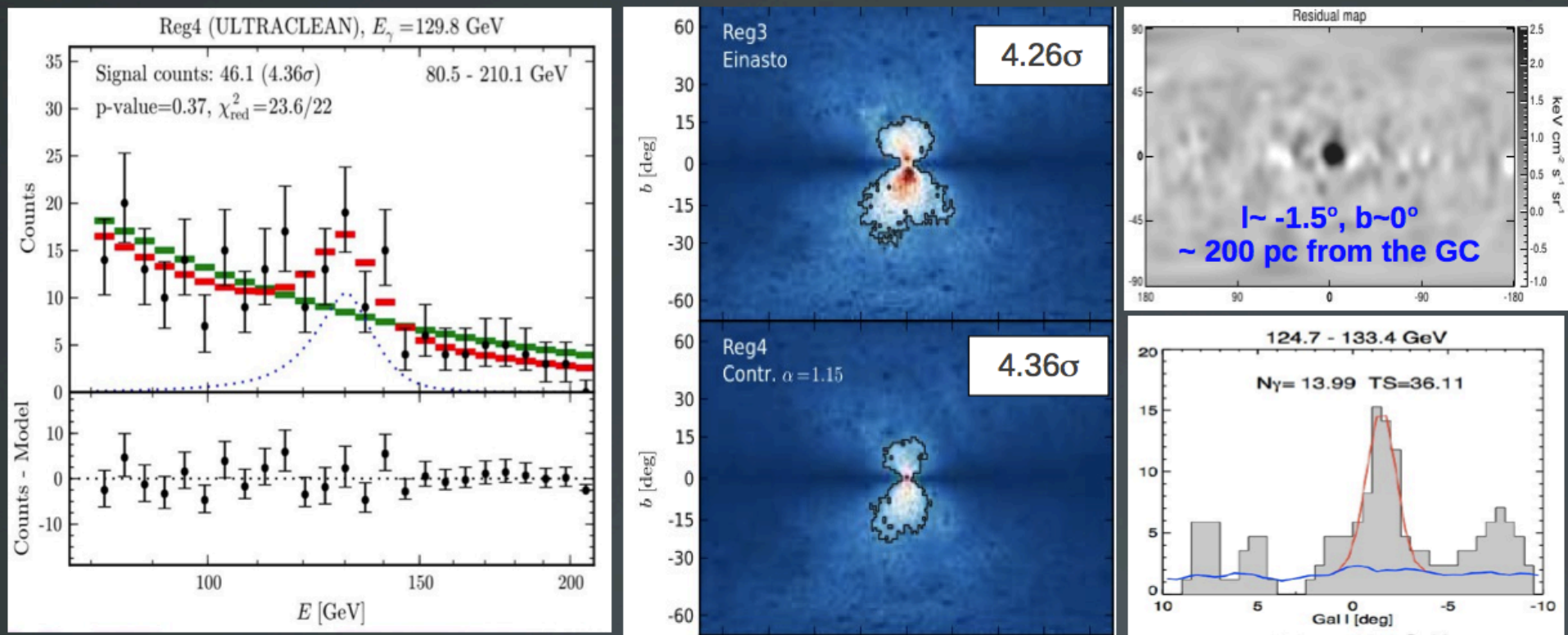


Fermi-LAT 130 GeV line

Claim for line-like feature ~ 130 GeV around Galactic Center
→ smoking gun for dark matter annihilation

$\sim 4\sigma$ local significance

Bringmann+ [arXiv:1203.1312], Weniger [arXiv:1204.2797], Su+ [arXiv:1206.1616, 1207.7060], ...

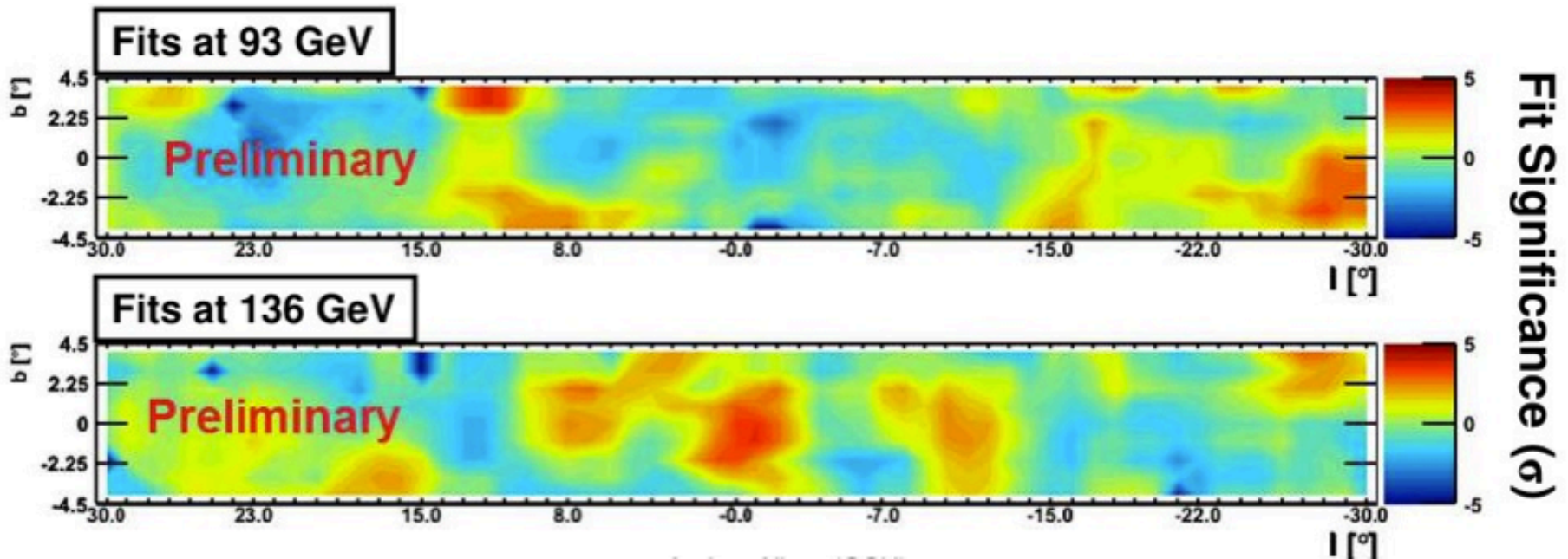


Fermi-LAT 130 GeV line: official statement

Official statement from Fermi-LAT collaboration

E. Nuss

- 4 years of data
- Improved response functions → energy shift of 5 GeV



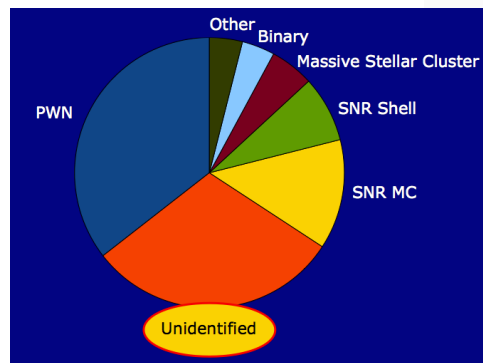
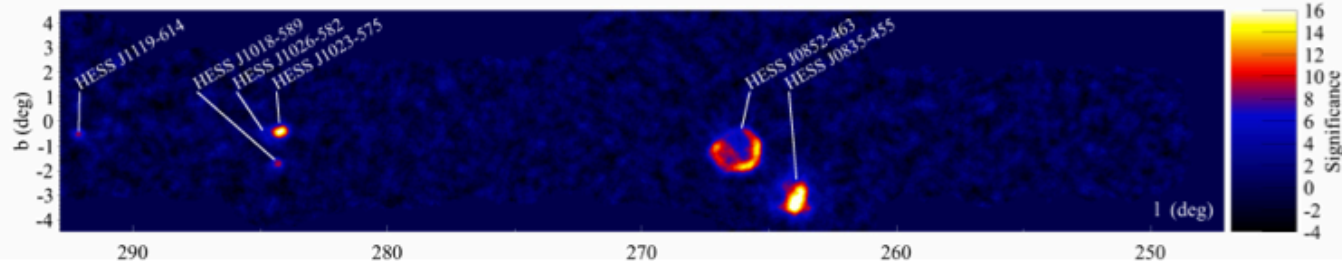
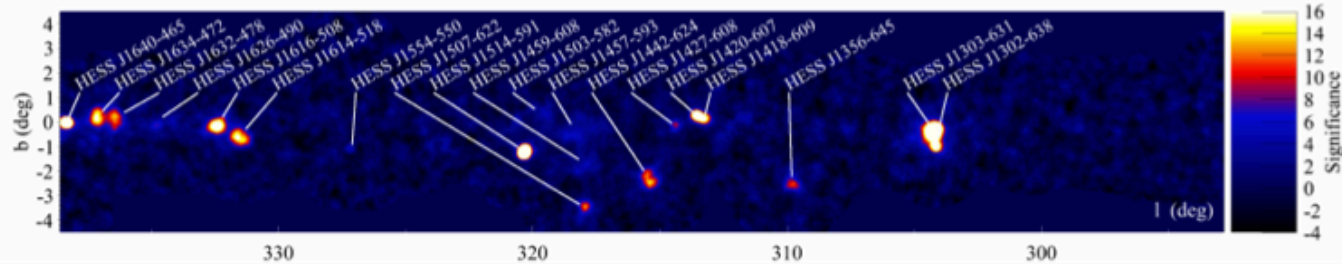
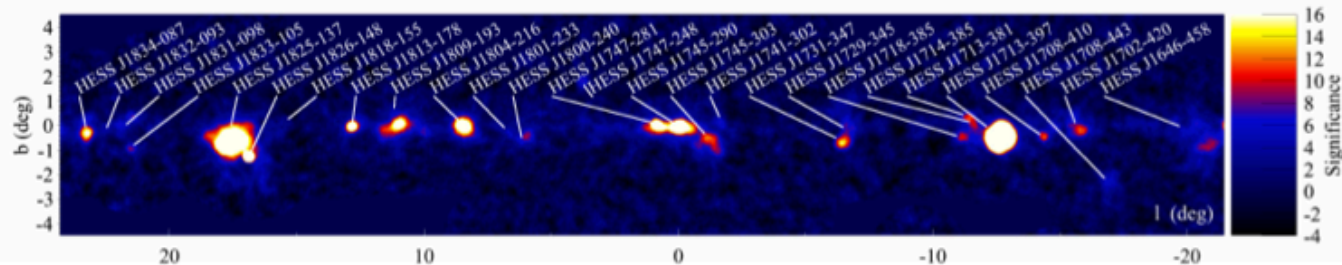
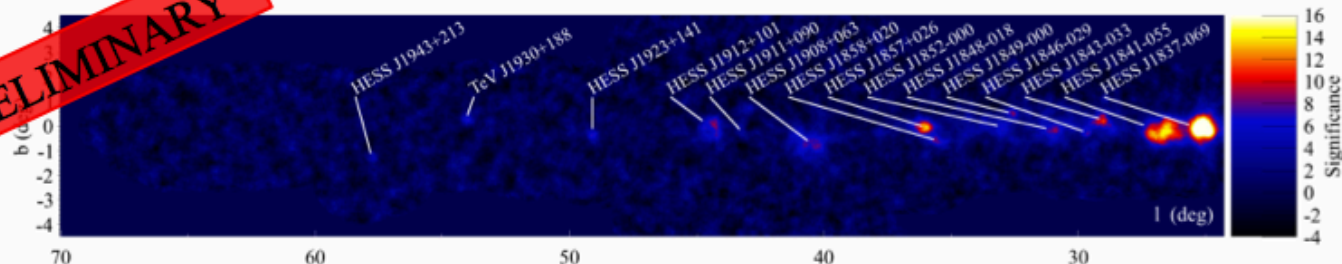
Feature @ 136 GeV seen at Galactic center: $< 2\sigma$ post trials
... And in earth limb control sample

Final conclusion not now, wait for H.E.S.S. 2...

H.E.S.S. Galactic plane survey

S. Carrigan

PRELIMINARY



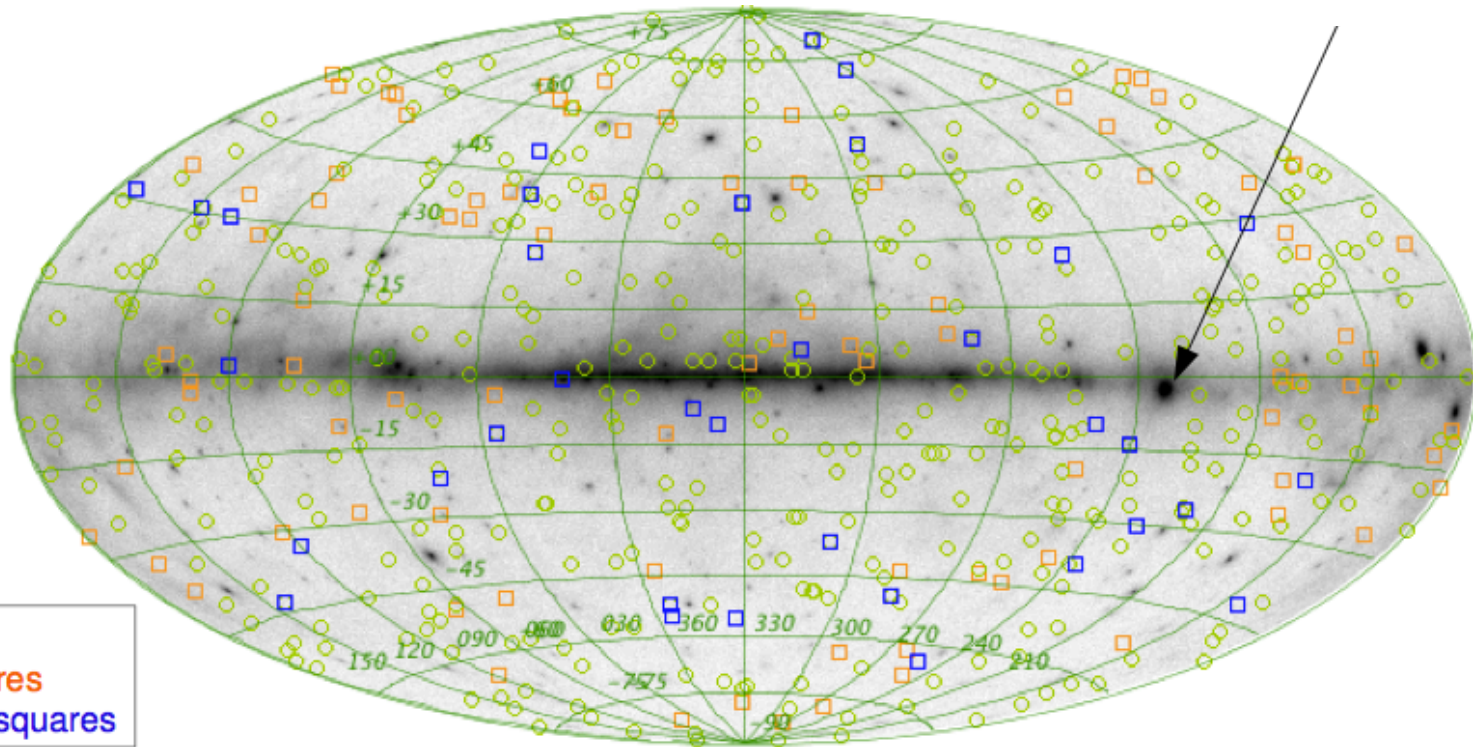
Population study of PWNe, SNRs

D. Fernandez

First Fermi-LAT GRB catalog

F. Piron

GBM 2-year catalog
LAT 3-year catalog

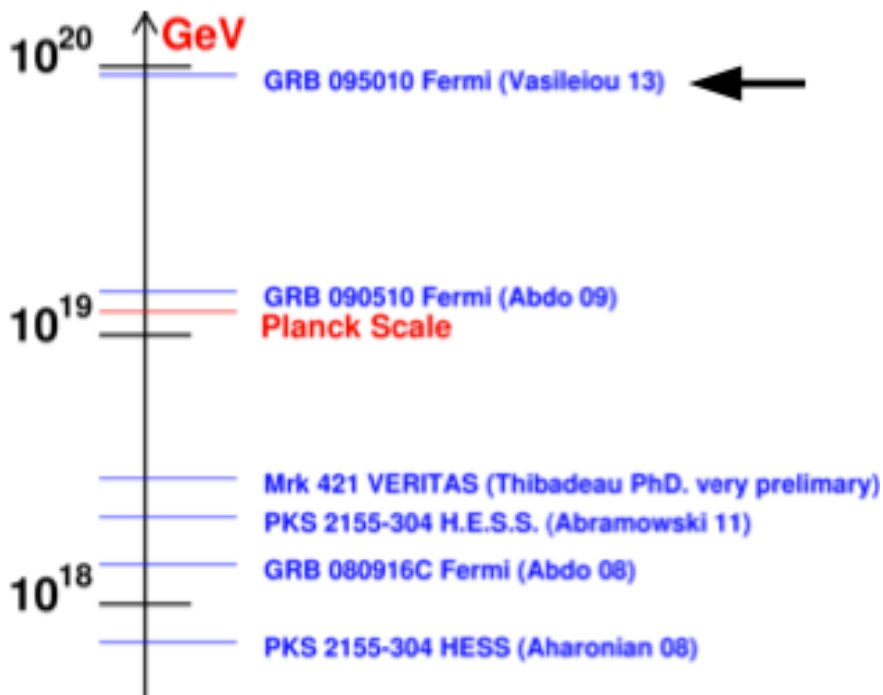


GBM LGRB: green circles
GBM SGRB: orange squares
LAT detections (35): blue squares

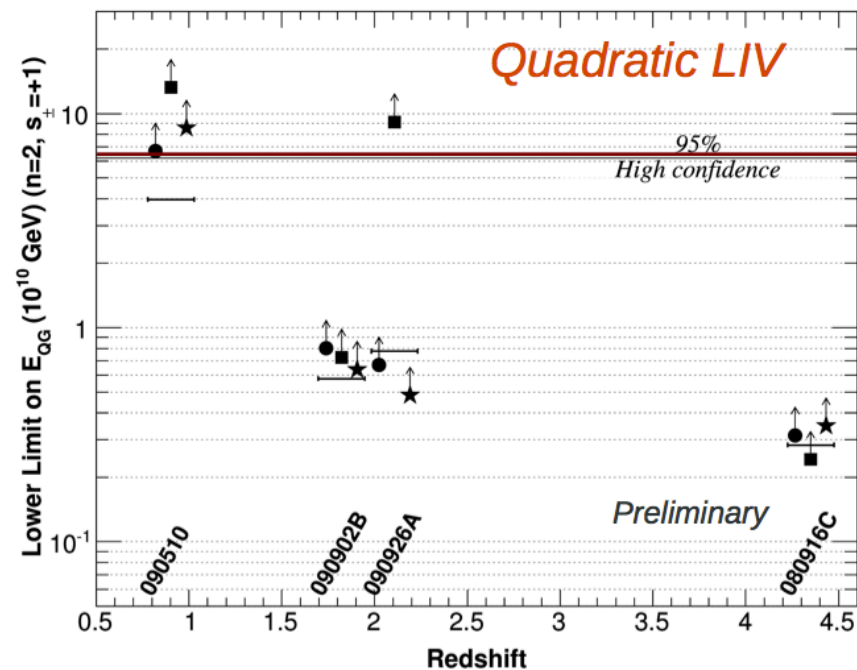
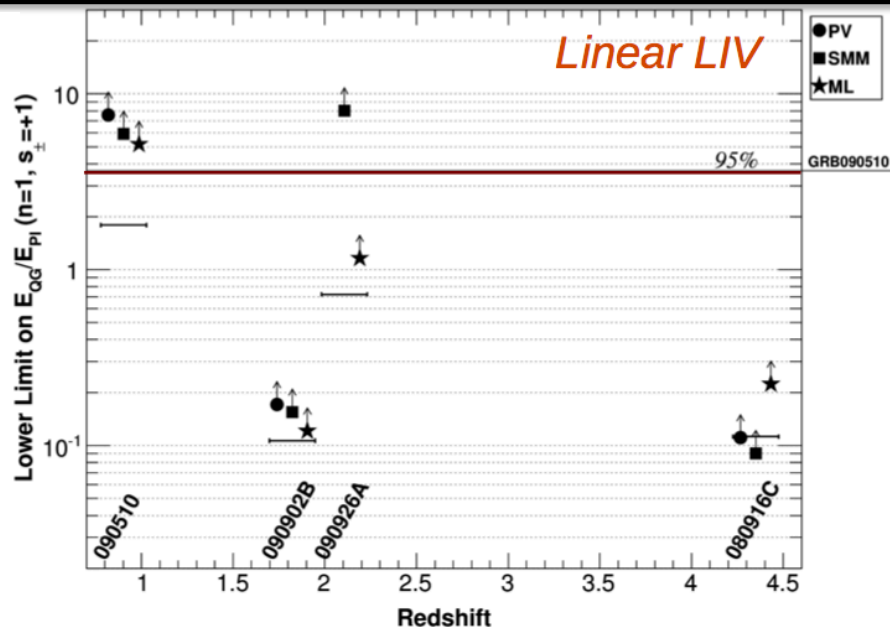
- 35 GRBs (30 long, 5 short), 10 with redshifts
- Models cannot entirely explain many of them
 - « Band model crisis »
 - need for physical models, leptonic/hadronic?

Constraints on LIV with Fermi GRBs

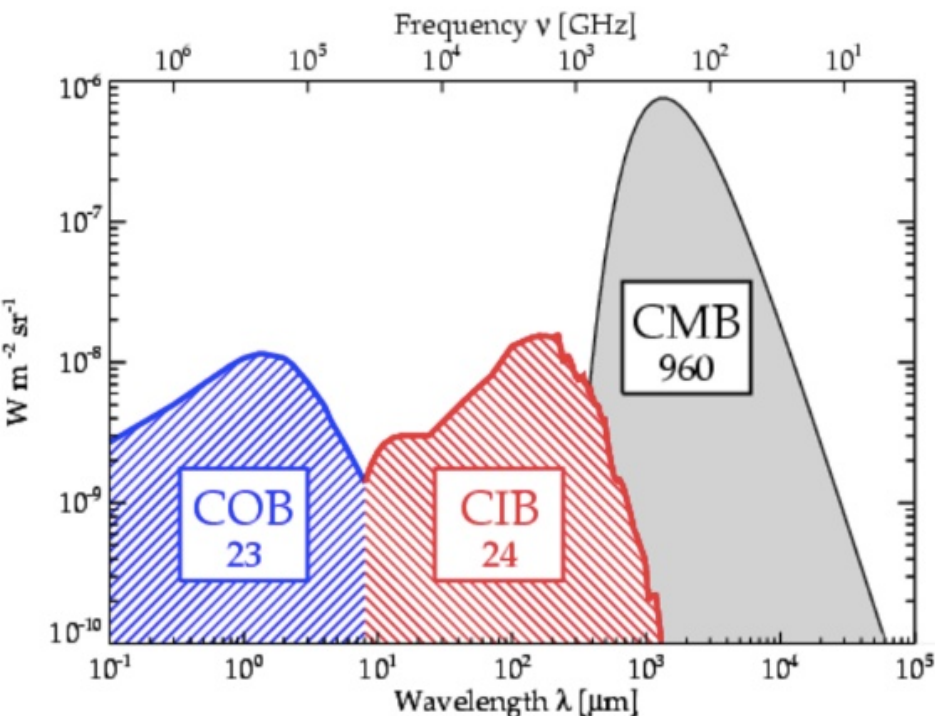
V. Vasileiou



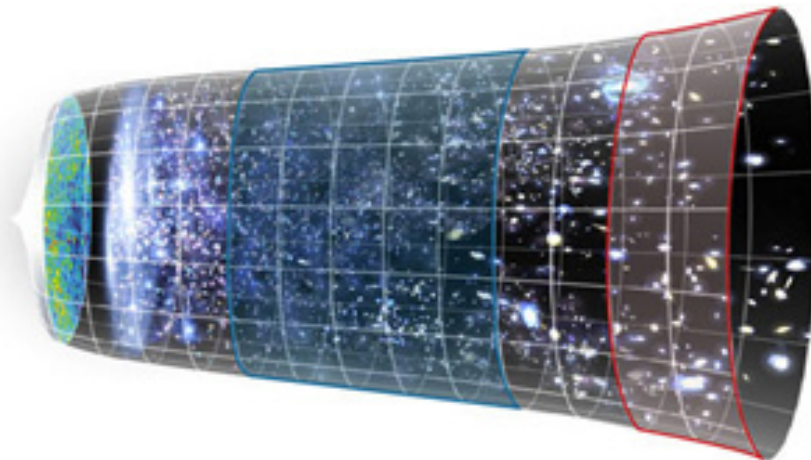
- Re-analysis of GRB 095010
- More robust technique
- Improved limits



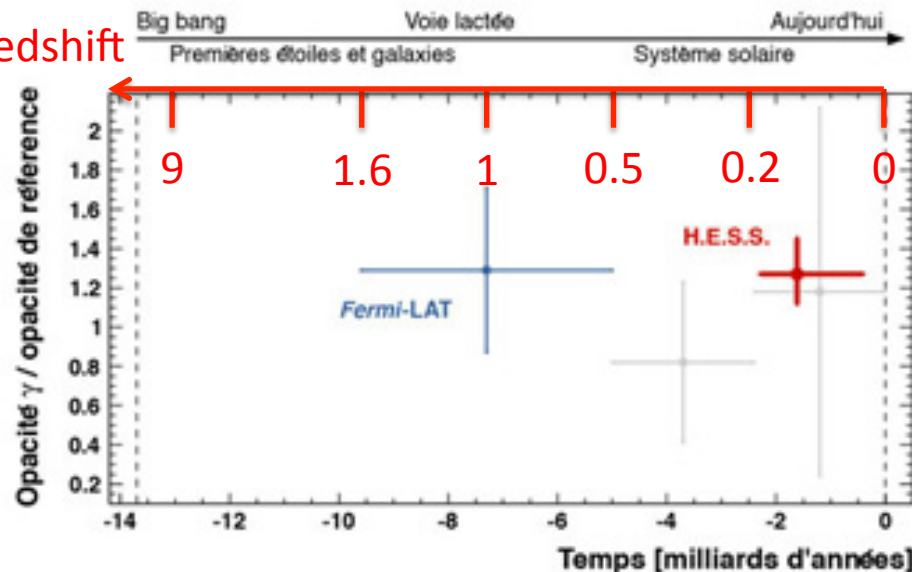
Fermi and H.E.S.S. measure the extragalactic background light



Ackermann et al. *Science* 2012
 Abramowski et al. *A&A* 2013



Redshift

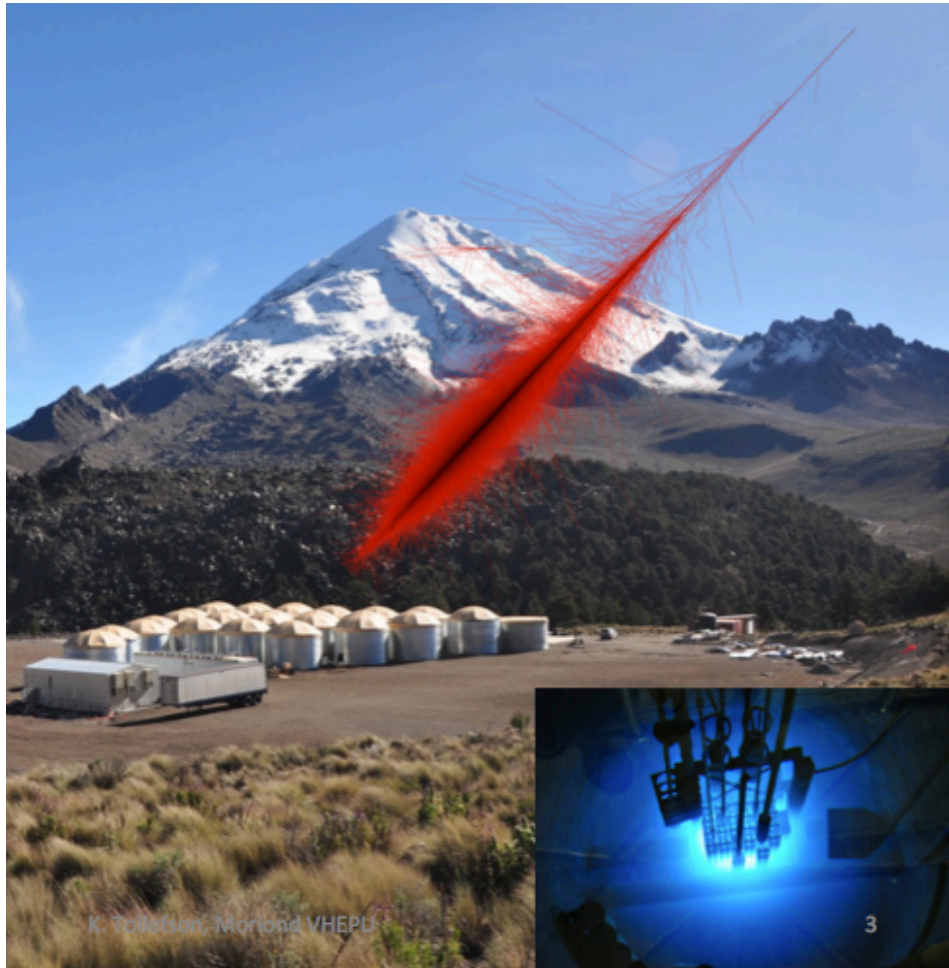


Hard to measure directly (contamination)

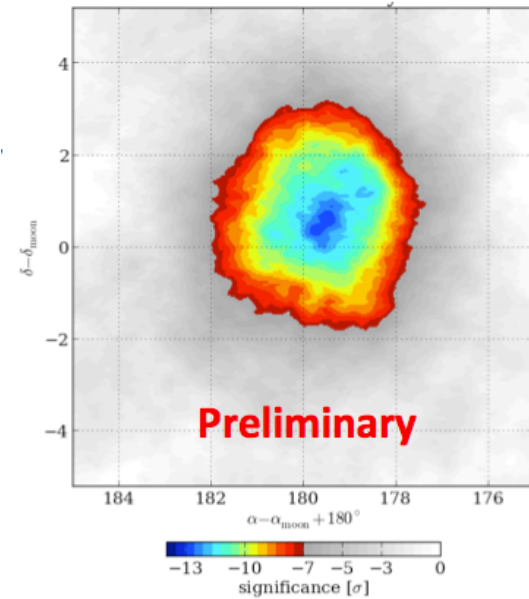
First measurement, with Fermi and H.E.S.S.
 Slightly higher than reference model

First light from HAWC

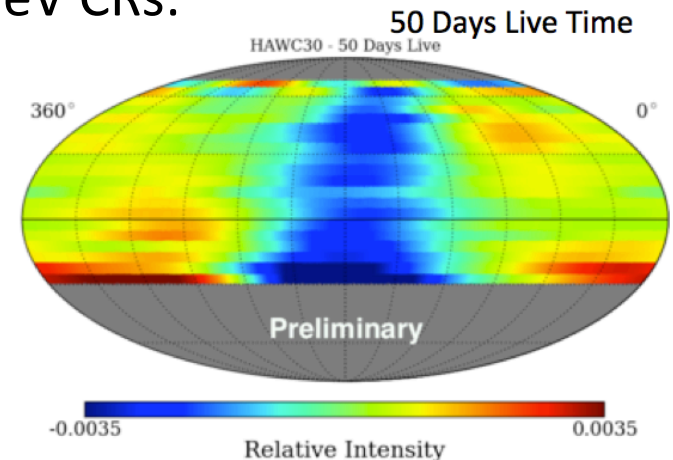
- Water cherenkov detector (Mexico)
- First light with 30 tanks
- Completed (300 tanks) by summer 2014



Moon shadow (70 days)



Large scale anisotropies of TeV CRs:

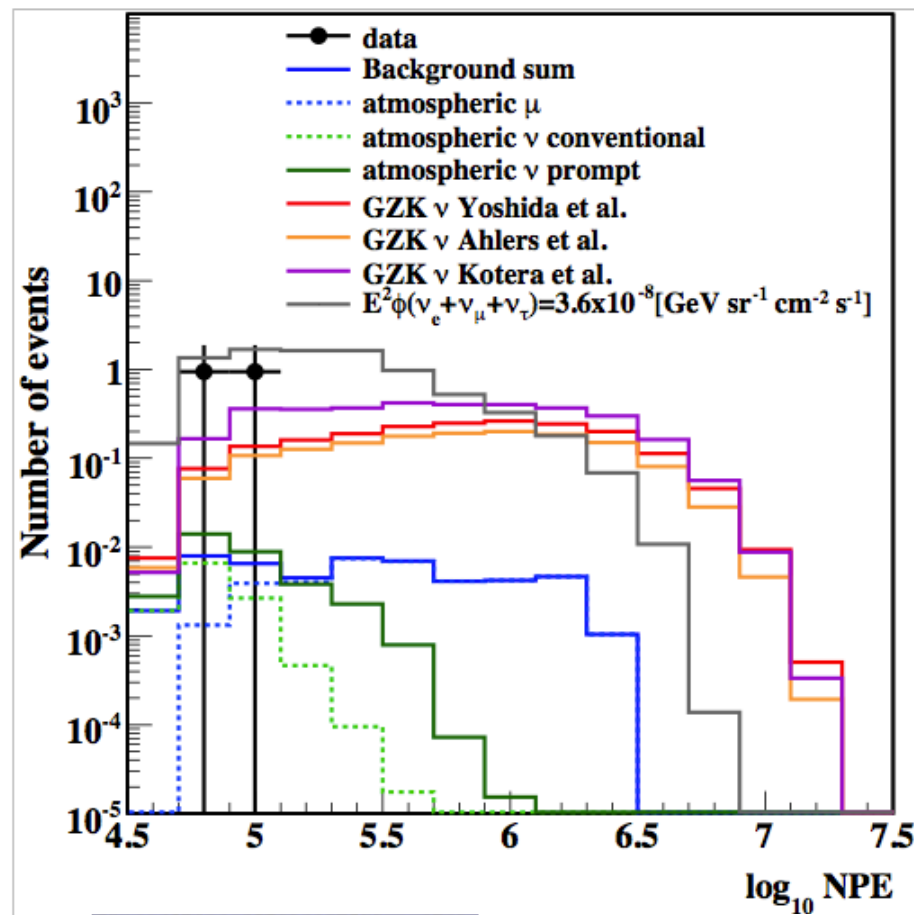
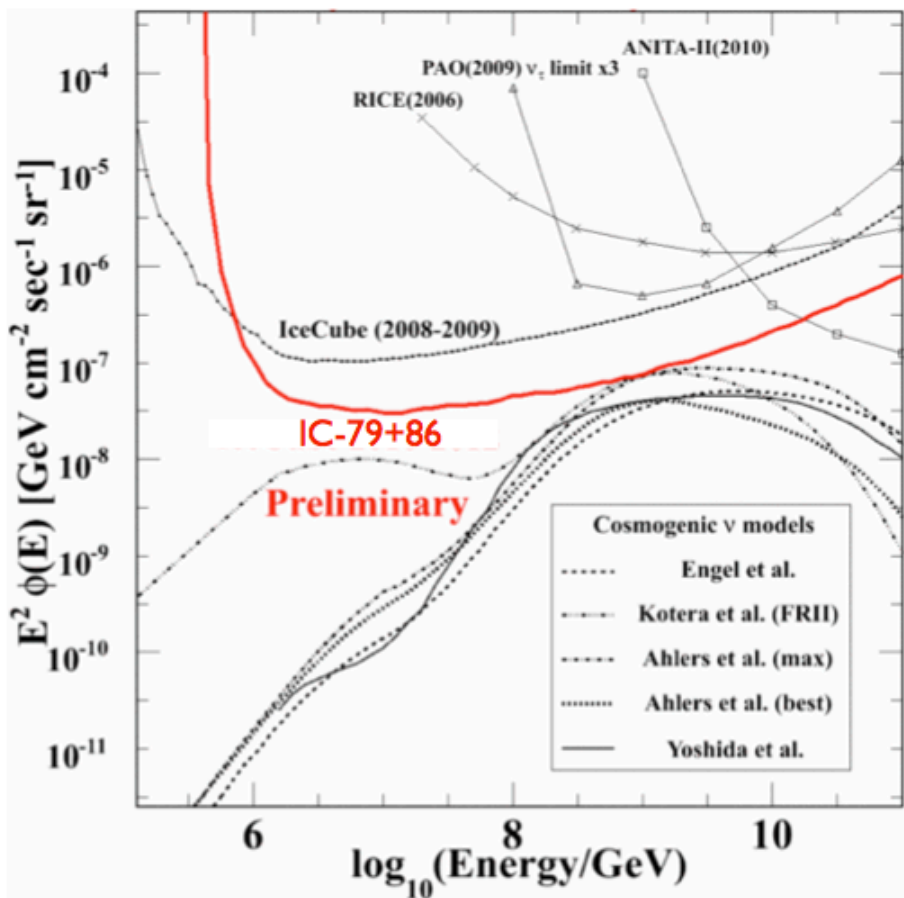


neutrino astronomy

Results from:

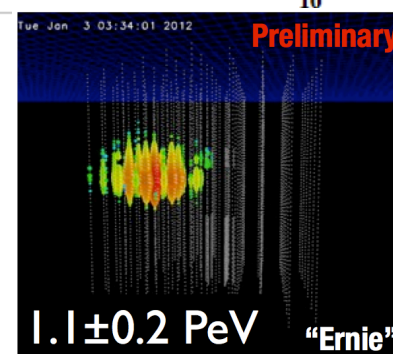
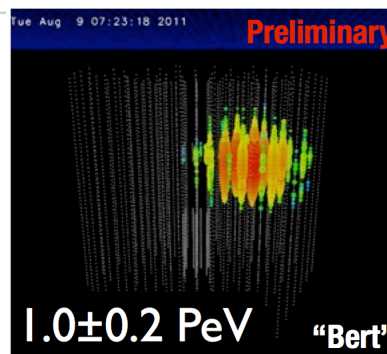
- Ice Cube
- Antares

Ice Cube cosmogenic neutrinos

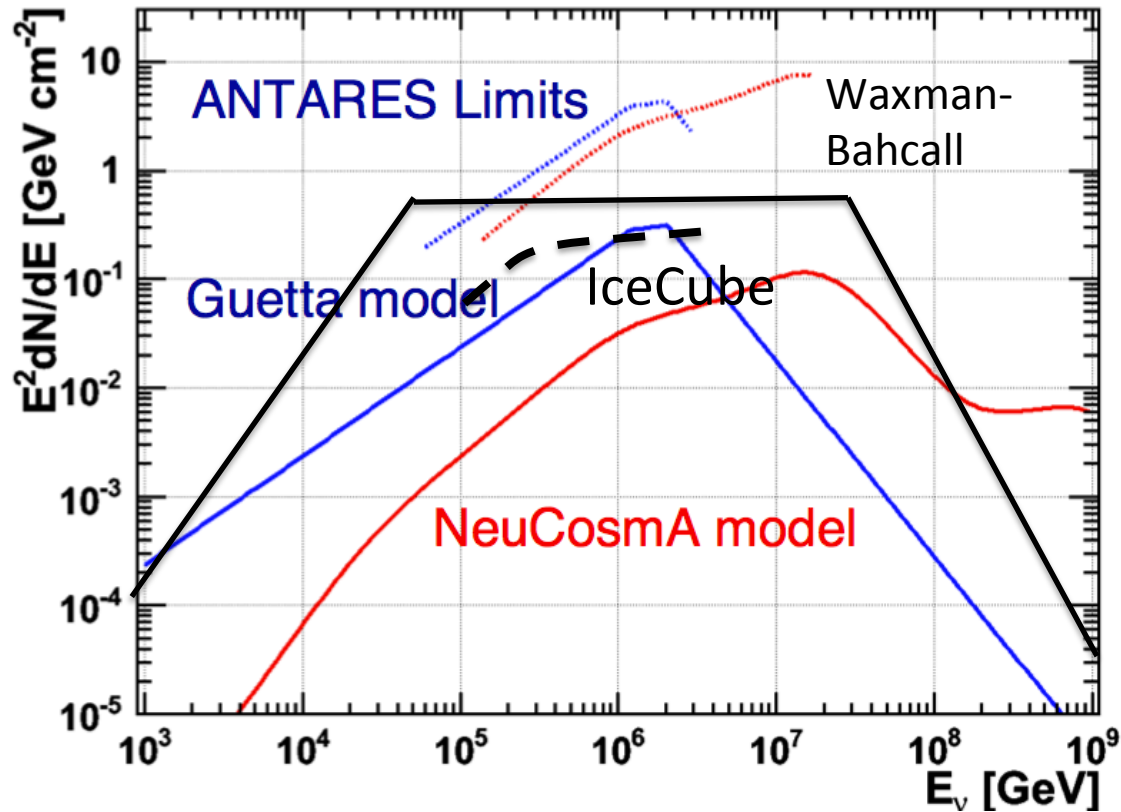


K. Mase

Significance of 2 non-atmospheric events / 351 days: 2.7σ



Antares and IC limits on GRBs



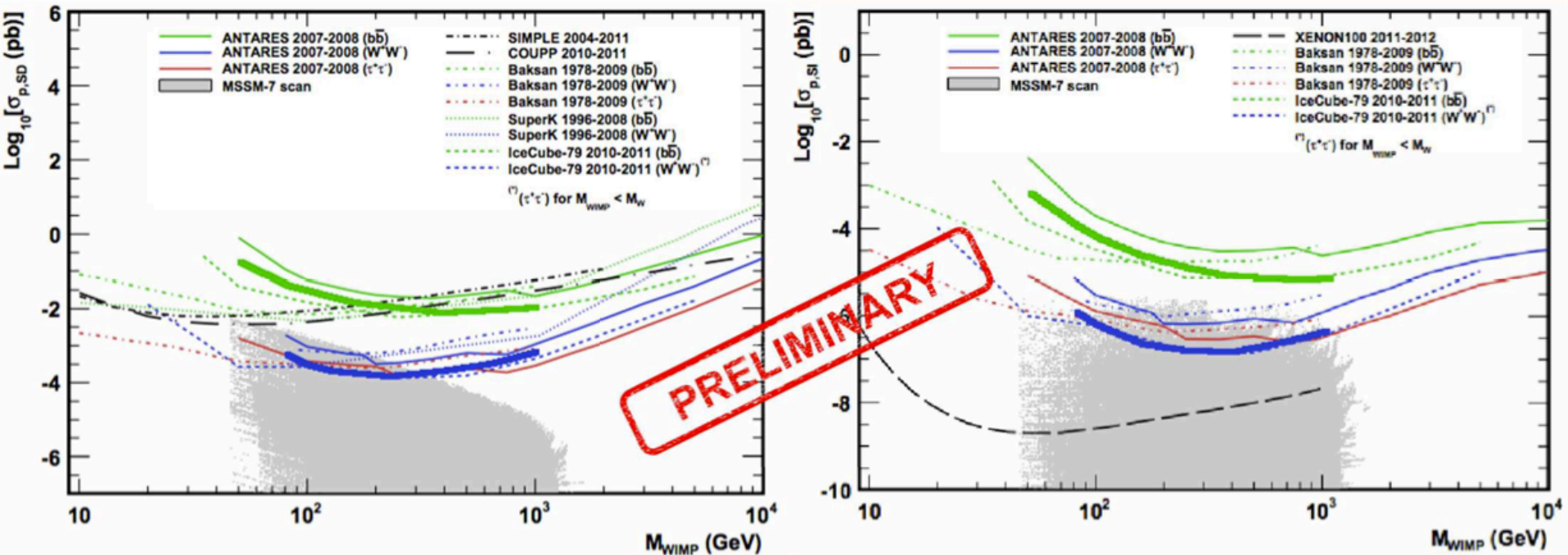
J. Schmid (Antares)
M. Ahlers (IC)

- new Antares analysis: 297 GRBs (40) between 2008-2011 (2007)
- Challenge GRBs as sources of UHECRs

Antares dark matter search

- Limits from solar neutrinos search
- First analysis with 2007-2008 data published last month
- Preliminary results with improved analysis and more data
- Competitive with IC limits

V. Bertin



Conclusion: recent results

- Fermi detects evidence for proton acceleration in SNRs
- Fermi statement on the 135 GeV line: no clear evidence
- Fermi and H.E.S.S. measure the extragalactic background light
- First light from HAWC
- IceCube detects two VHE events, possibly astrophysical