Recent results from HAWC



Colas Rivière (UMD) for the HAWC Collaboration Workshop on a wide field-of-view Southern Hemisphere TeV gamma-ray observatory Puebla, Puebla, Mexico — 2016-11-10



Wide field of view



Wide field of view



Targets



Steady source survey

- Wide FoV: Look everywhere
- High energy reach: where IACTs are statistics limited
- Extended: can see sources too big for IACTs' FoV



Energy range



- · Left: Differential sensitivity, per quater decade.
- Right: Energy of the events providing most of the sensitivity, for 3 different spectrum hypothesis.

Skymap — HAWC, 17 months, point source (index -2.7) model

HAWC - 17 months



sqrt(TS)

7

Fermi Bubbles

PAPER IN PREPARATION

8



• See next talk by Hugo Ayala

C. Rivière

Geminga / PSR J0659+1414



 Geminga detected by Milagro in 2009, confirmed by HAWC.

- 3e5 yr, 250 pc, 3e34 erg/s
- 2HWC J0658+152 discovered by HAWC.
 - PSR J0659+1414: le5 yr, 288 pc, 3.8e34 erg/s
- Both seen as extended hard sources.

Geminga / PSR J0659+1414



- Measure spectrum and morphology
- Are we seeing emission from electrons diffused into the ISM?
- Measure diffusion coefficient
- Can we confirm or rule out nearby pulsar as source of local e±?

Variability

PAPER IN PREPARATION



C. Rivière

Inner Galactic Plane

PAPER IN PREPARATION



Inner Galactic Plane, HAWC, H.E.S.S., Fermi 2FHL



Inner Galactic Plane, HAWC, H.E.S.S., Fermi 2FHL









16

Right Ascension (J2000)



Executioner



- 2-3 sources for HAWC, only I point source in previous VERITAS/H.E.S.S. analysis, attributed to PWN. On 2HWC J1928+177, HAWC flux ~10 times larger than published VERITAS limit.
- New analysis by VERITAS, with more data, searching for HAWC counterpart. No detection, will set limits.
- PSR J1928+1748: 88 kyr, 8 kpc, 1.6e36 erg/s (Geminga: 1e5 yr, 288 pc, 3.8e34 erg/s)
- Possible reason why only HAWC sees them: harder, extended.

Rabbit



- No previously known TeV source.
- New analysis by VERITAS, archival plus new data, source confirmed.
- Tentative association 3FGL J1951.6+2926 / PWN DA 495?
- See [J. Holder, Gamma 2016, arXiv:1609.02881].





• HAWC catalog coming soon

FAPER IN PROGRESS

PAPER IN PROGRESS

- Preliminary results were shared under MoU, allowing:
 - analysis of archival data
 - new observations
- Join follow-up papers on the way

H.E.S.S.







- Not mentioned here:
 - AGN variability (+ FACT)
 - Flare monitor
 - TeV binary search
 - Triggered GRB analysis
 - Untriggered GRB search
 - Dark matter searches
 - IceCube follow-up
 - Ligo GW follow-up
 - Cosmic ray anisotropy
 - and many more...

ATEL SENT, PAPER IN PROGRESS ALERTS SOON, PAPER IN PROGRESS

PAPER IN PROGRESS ALERTS SOON, PAPER IN PROGRESS PAPER IN PROGRESS ATEL SENT, PAPER IN PROGRESS ATEL SENT PAPER IN PROGRESS

We're just getting started!

