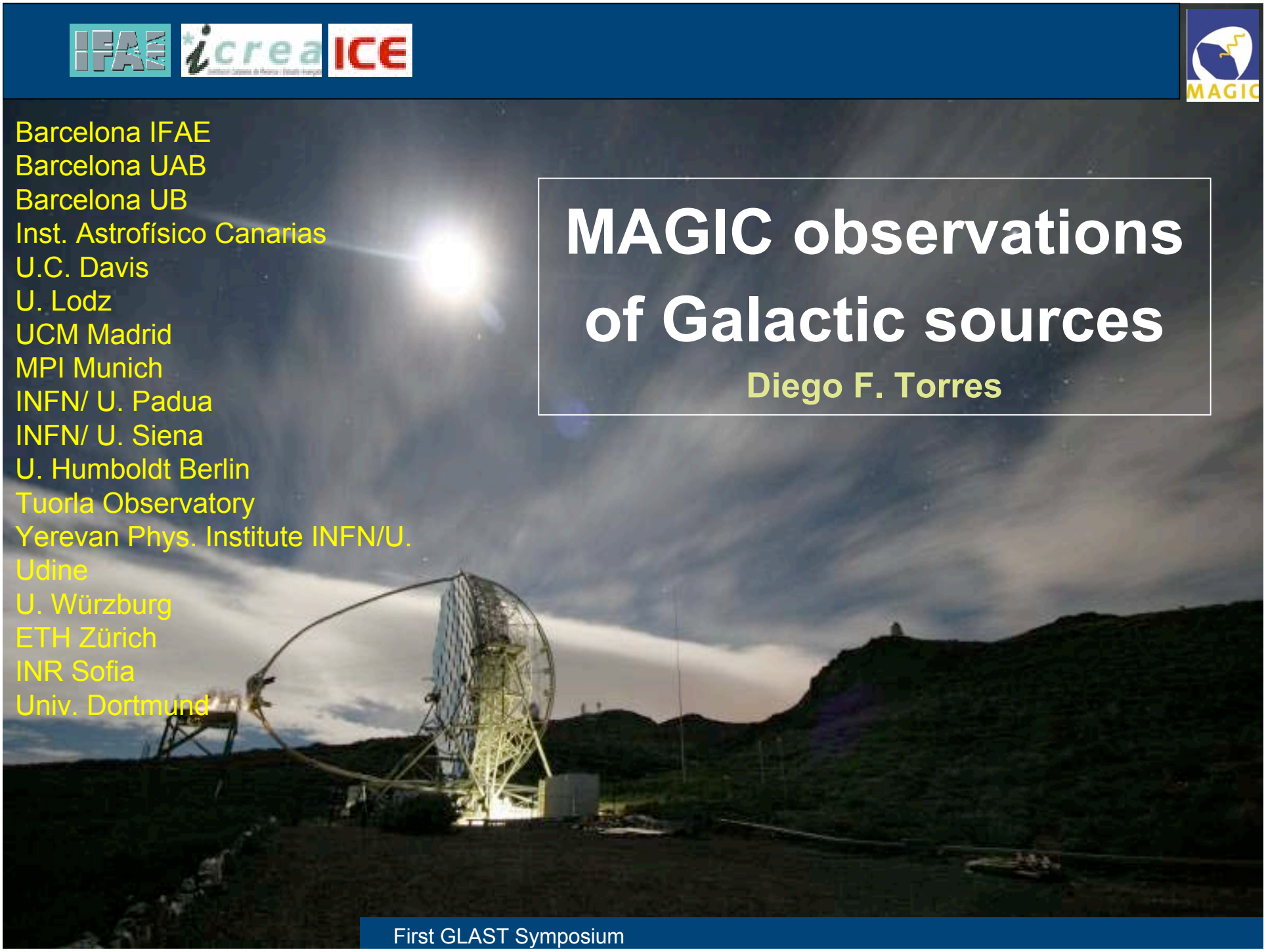


Barcelona IFAE
Barcelona UAB
Barcelona UB
Inst. Astrofísico Canarias
U.C. Davis
U. Lodz
UCM Madrid
MPI Munich
INFN/ U. Padua
INFN/ U. Siena
U. Humboldt Berlin
Tuorla Observatory
Yerevan Phys. Institute INFN/U. Udine
U. Würzburg
ETH Zürich
INR Sofia
Univ. Dortmund

MAGIC observations of Galactic sources

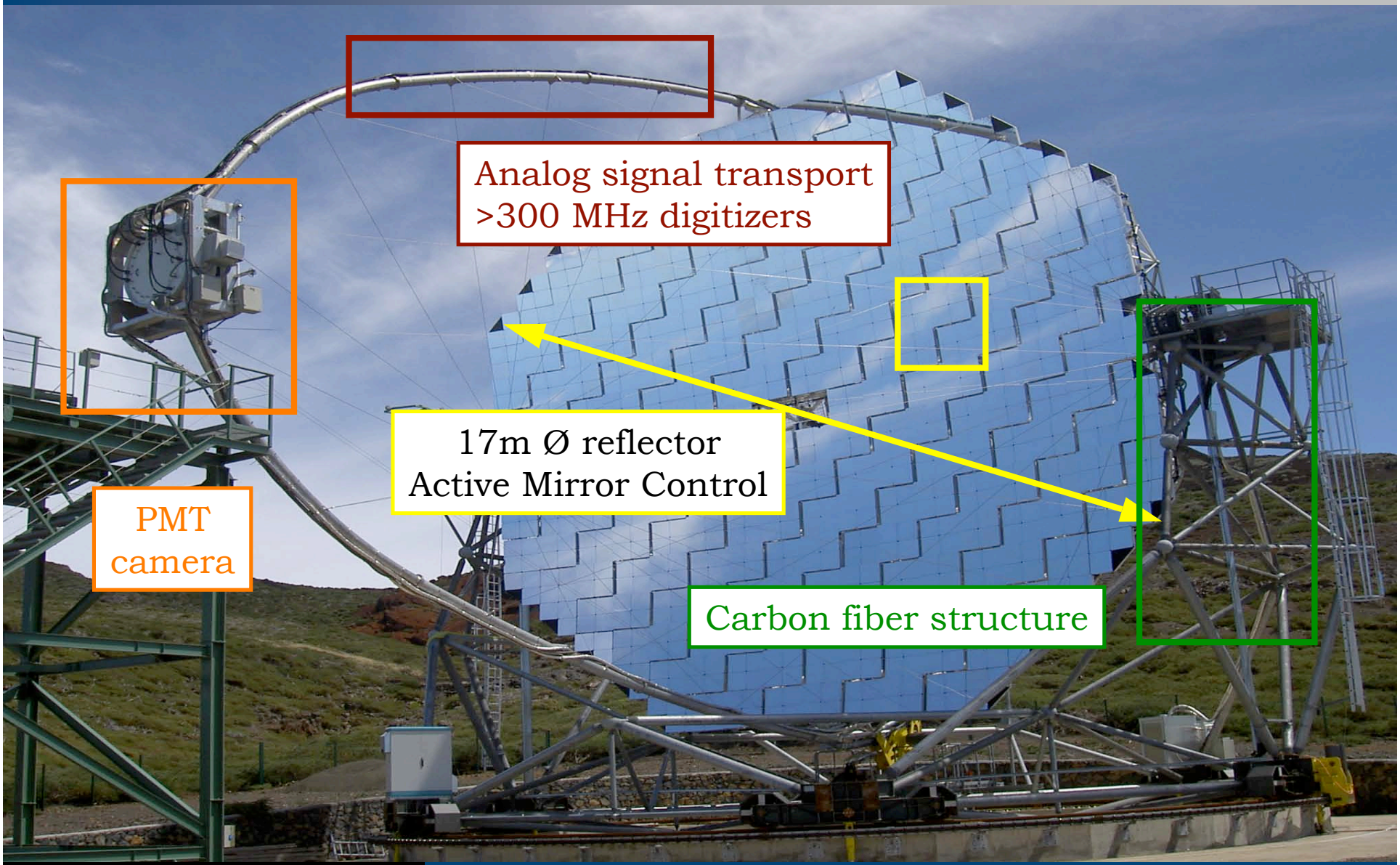
Diego F. Torres

Summary

MAGIC-I and -II: the instruments

- Description of the instruments
- Schedule of MAGIC-II

MAGIC-I: some Galactic results


Analog signal transport
>300 MHz digitizers
17m Ø reflector
Active Mirror Control
PMT
camera
Carbon fiber structure

Description of the instrument

- **MAGIC is an Imaging Air Cherenkov telescope operating in the energy range E>50 GeV.**
- **Located at Roque de Los Muchachos observatory, Canary Islands, Spain, 28.8°N, 17.9°W, ~2200 m a.s.l..**
- **Largest single-dish (17 m Ø) ⇒ intends to lower energy threshold**

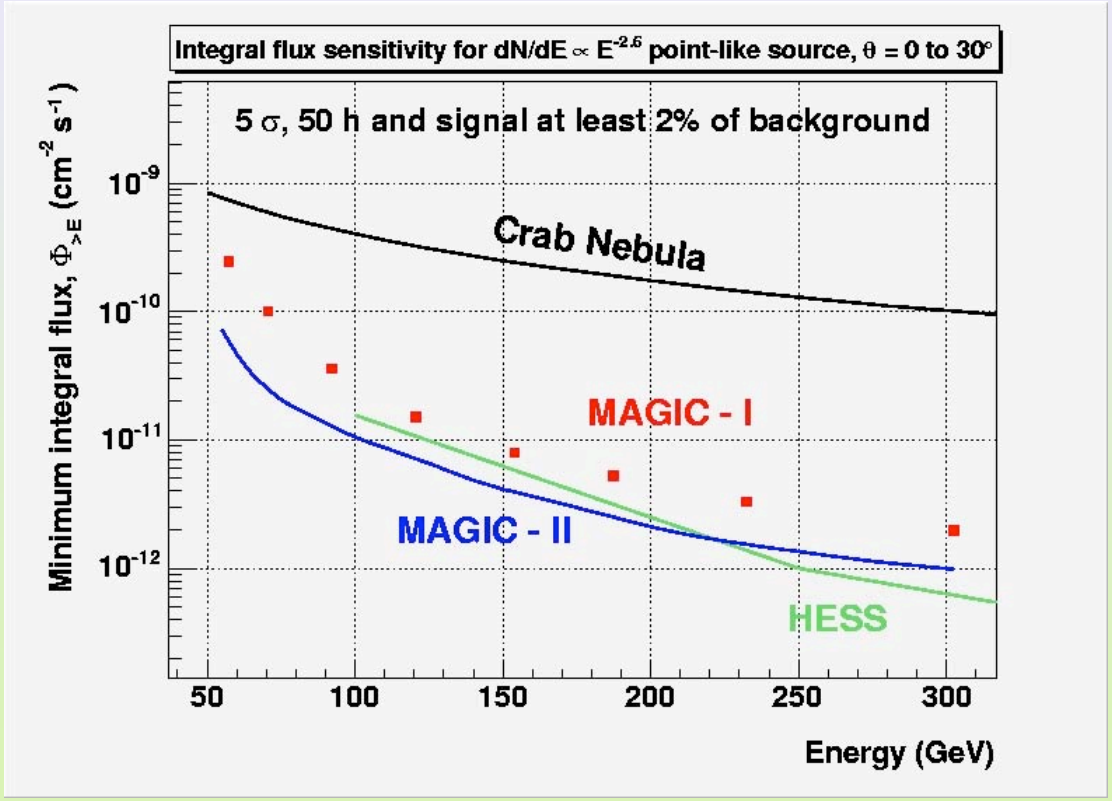
- **PMT camera with 3.5° Ø FOV**
- **Angular resolution (σ) ~ 0.1°**
- **Energy resolution 20-30%**
- **Flux sensitivity: 2.5% Crab Nebula flux with 5σ in 50h**
- **Fast repositioning (<40s average) for GRB observation**

MAGIC-II: schedule

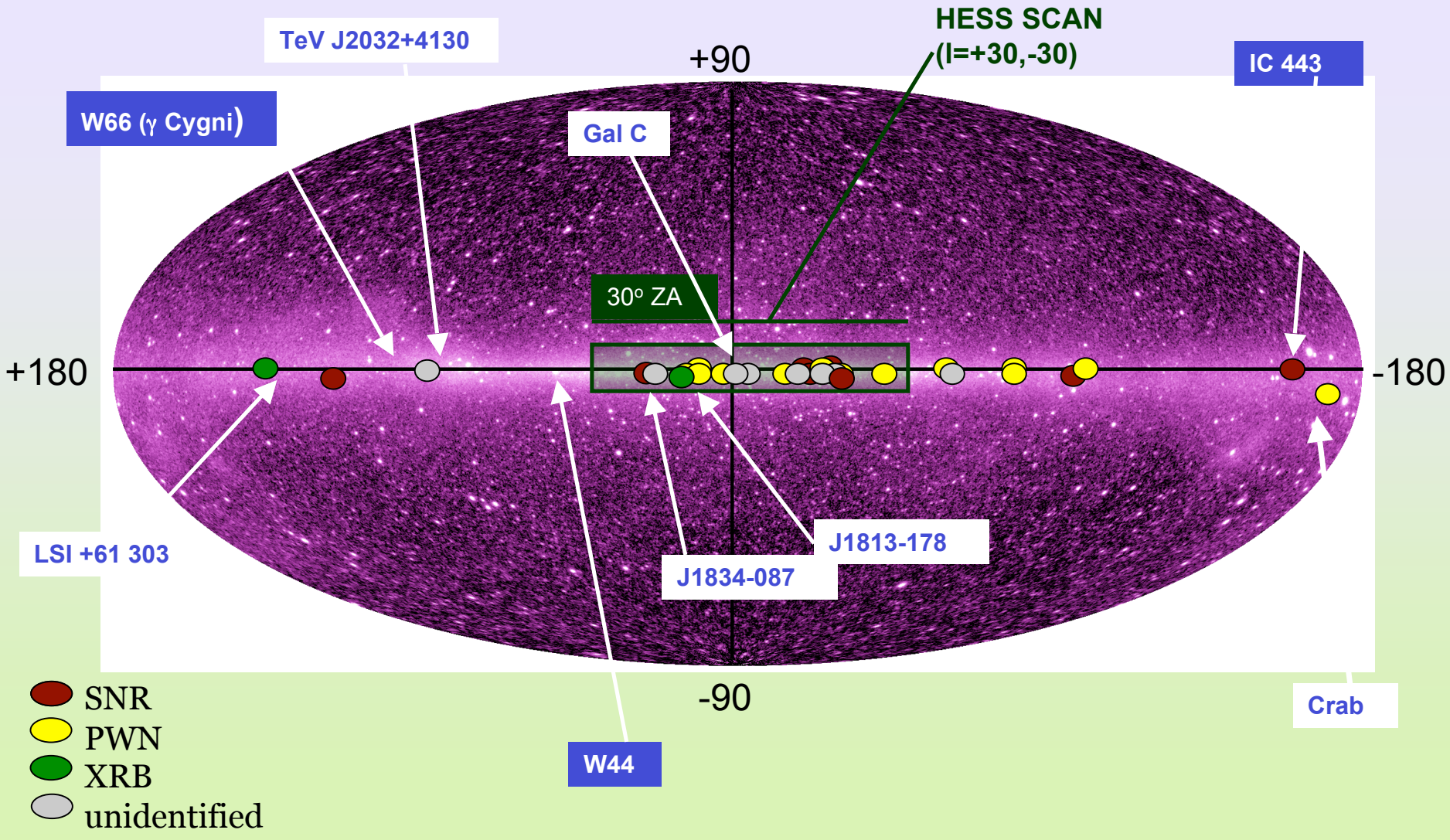
- **Foundation, rails, frame, motors and drive equipment are already in place.**
- **Entering production for mirrors and electronics.**
- **Expect to start comissioning in Fall 2007, synchronous with GLAST.**

MAGIC-II: expected performance

- **Expect a factor 2 better sensitivity.**
- **Gain may be larger below 100 GeV, i.e., effectively reduced analysis threshold.**

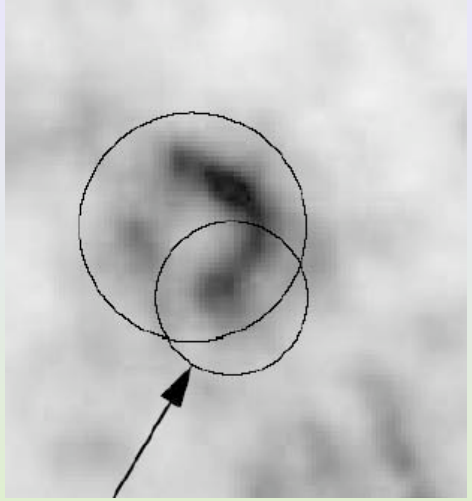


The galactic plane: TeV galactic sources



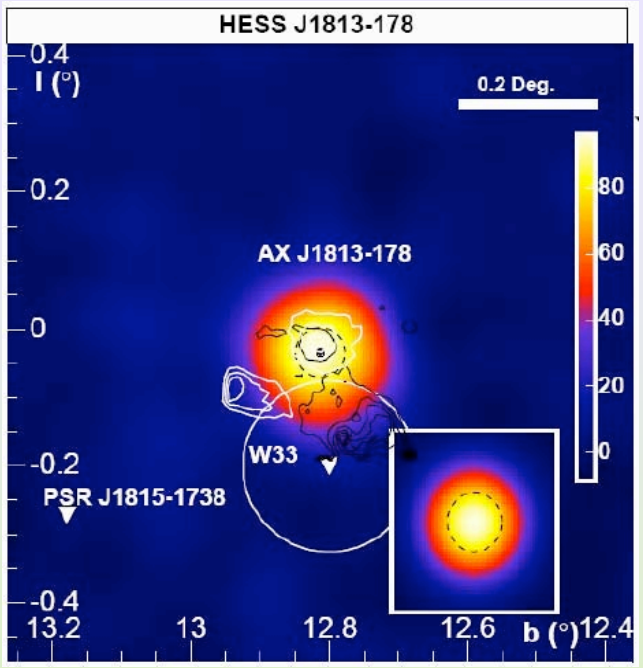
SNR Connection: HESS J1813 & HESS J1834

HESS J1813-178



After HESS discovery

- **X-rays ASCA**
- **INTEGRAL**
- **RADIO VLA (SNR G12.8 0.0)**

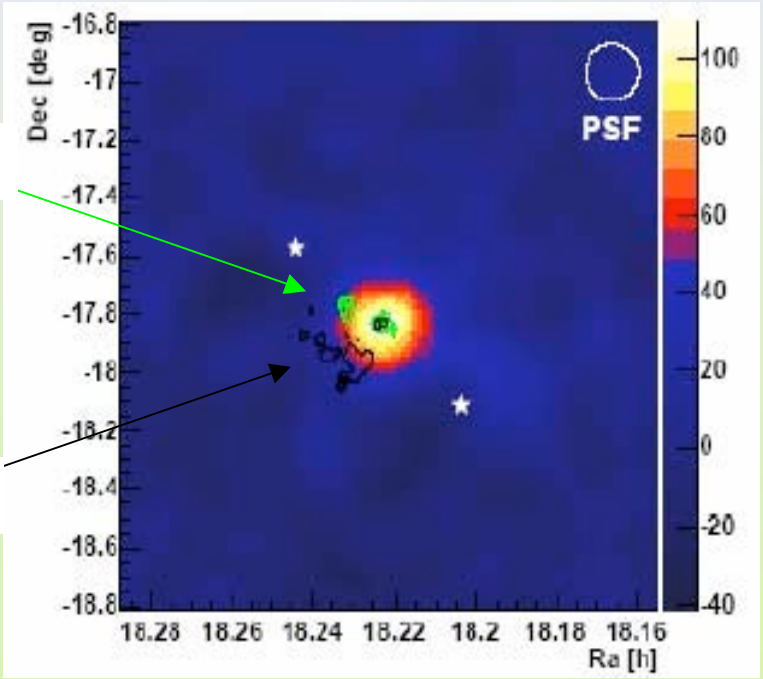


- **Radio (20 cm VLA): White et al 2005, Brogan et al 2005**
- **Hard X-rays (Integral): Ubertini et al 2005.**

SNR Connection: HESS J1813 & HESS J1834

HESS J1813-178

MAGIC:
Section of shell spatially coincident with SNR G12.8-0.02
Zenith angle: 47°-54° – Threshold: 400 GeV – 25 hours



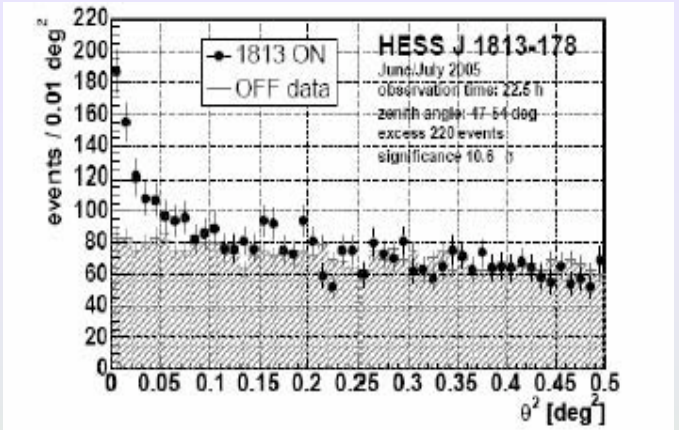
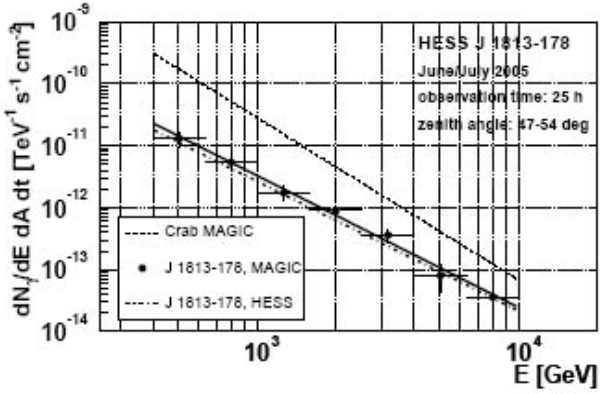
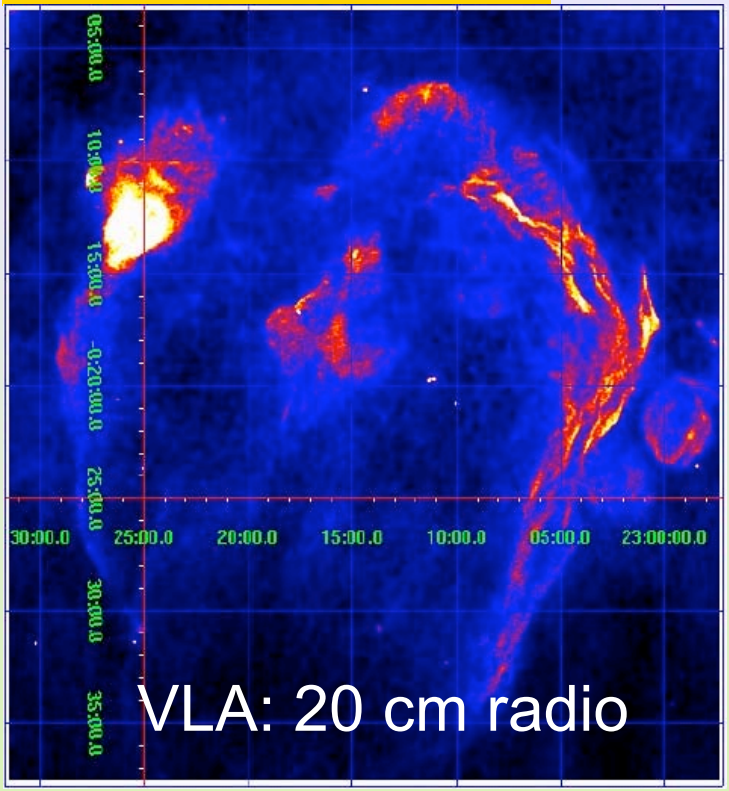


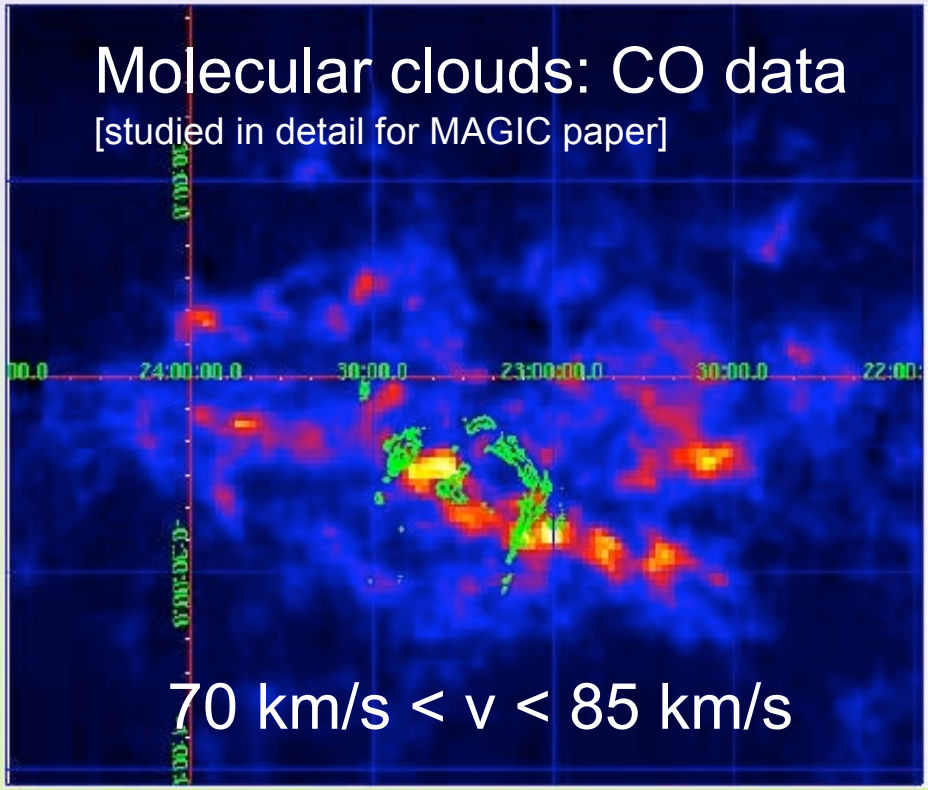
FIG. 2.— Distributions of θ^2 values for the source and anti-source, see text, for SIZE $\geq$ 600 ph. el. (corresponding to an energy threshold of about 1 TeV).



SNR Connection: HESS J1813 & HESS J1834

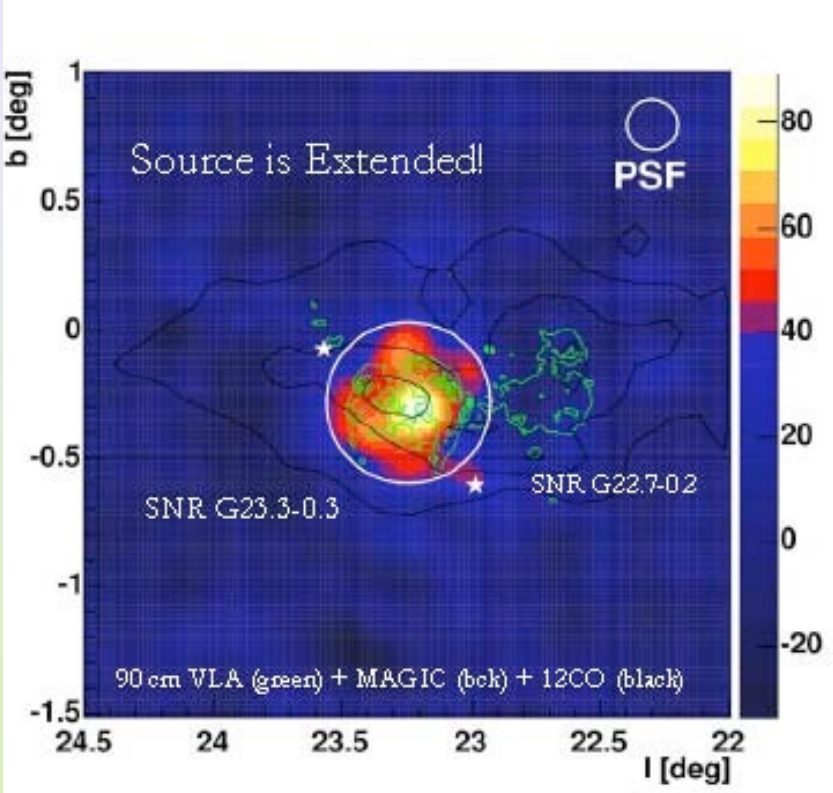
HESS J1834-087



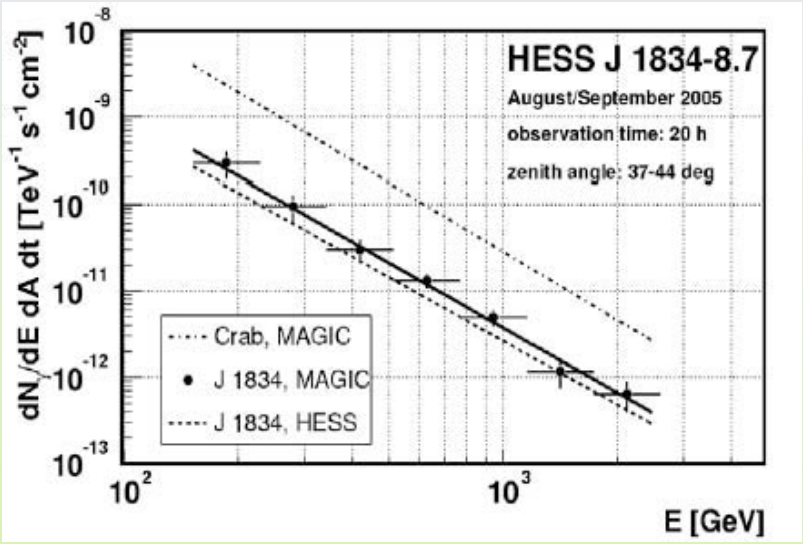


SNR Connection: HESS J1813 & HESS J1834

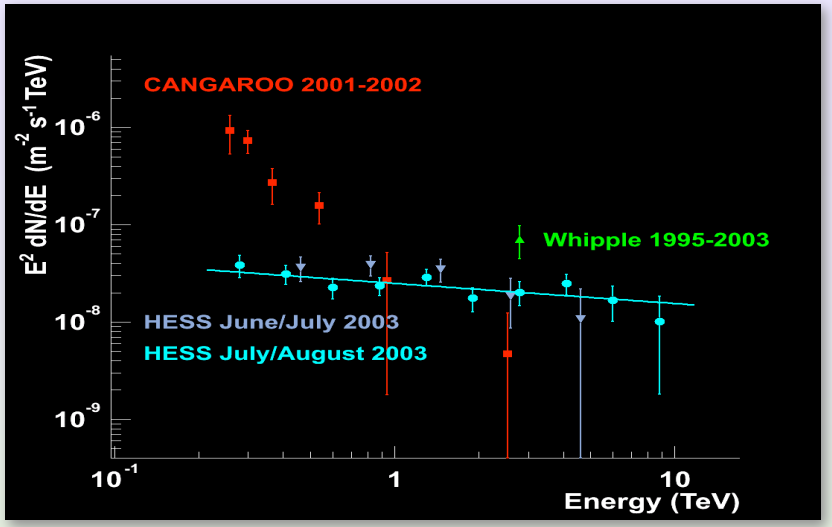
HESS J1834-087

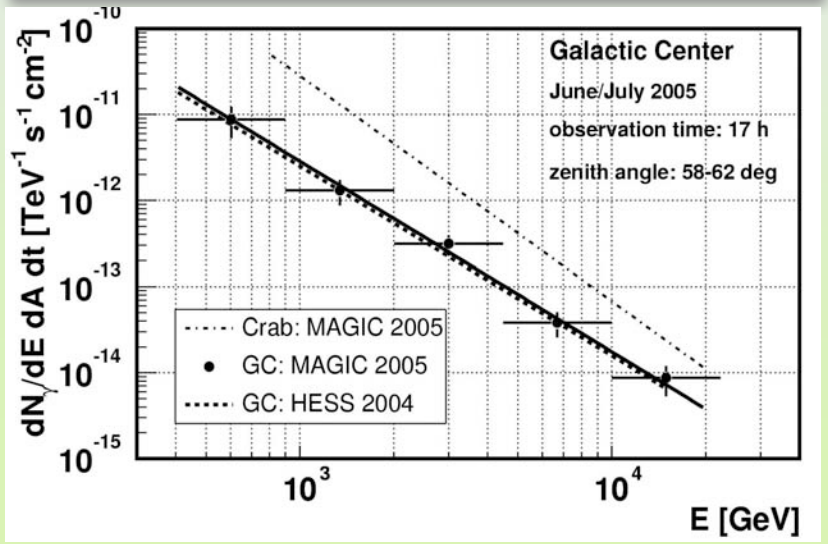


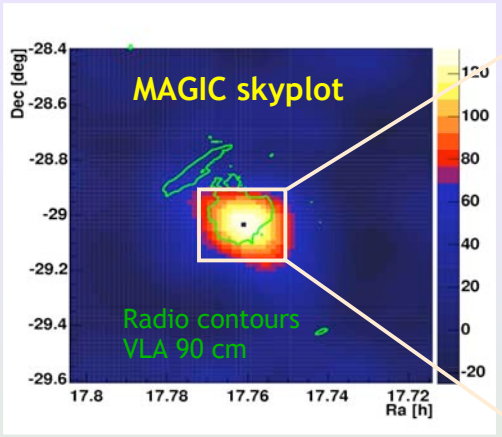
- SNR G 23.3-0.3 (W 41)
- Zenith angle 37°-44°
- Threshold 150 GeV
- Existence of dense cloud, also reported by MAGIC (12 and 13CO)

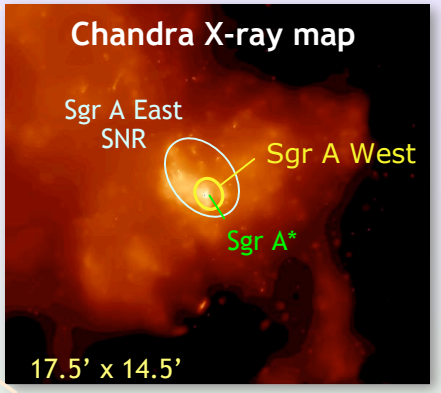


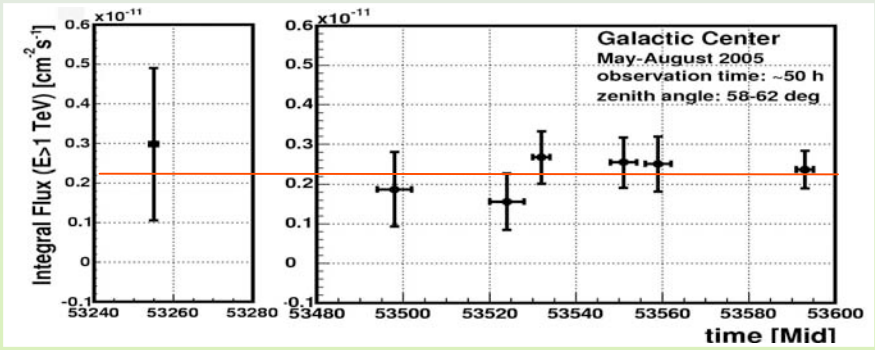
Galactic Center









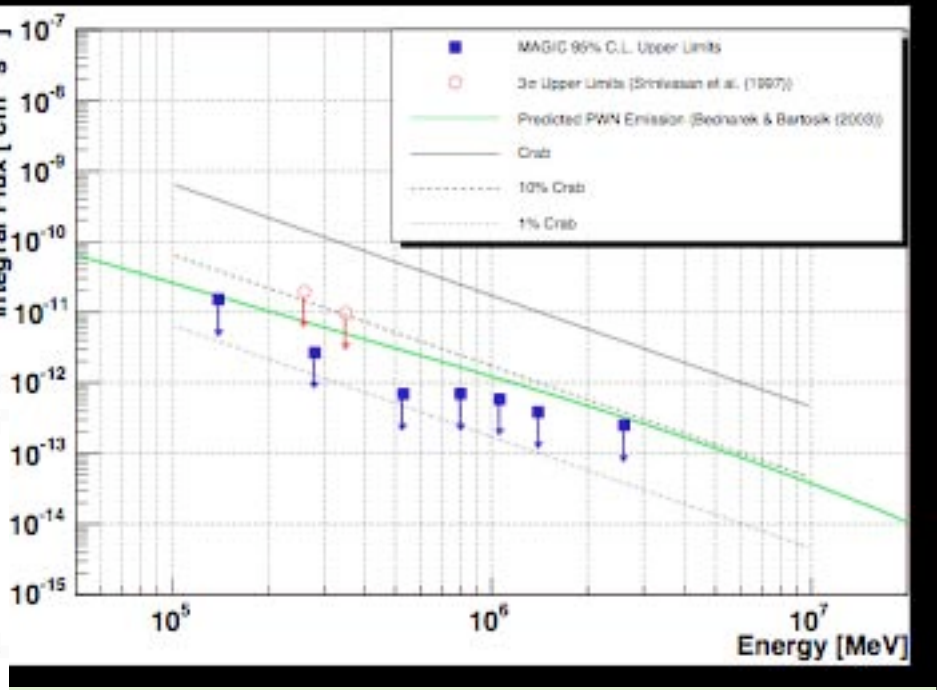


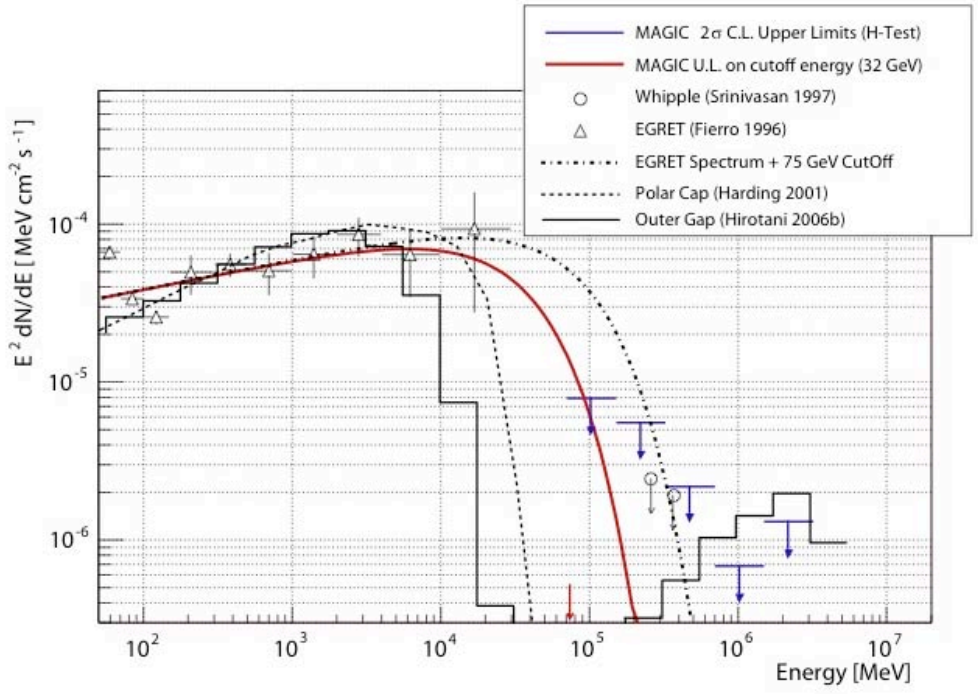
Observed for 17h Jul/Aug.05; ZA:58°-63°
- **6 σ signal**
- **α = -2.2±0.2**
- **600 GeV - 15 TeV**
- **Excellent agreement with H.E.S.S. ; incompatible with CANGAROO**

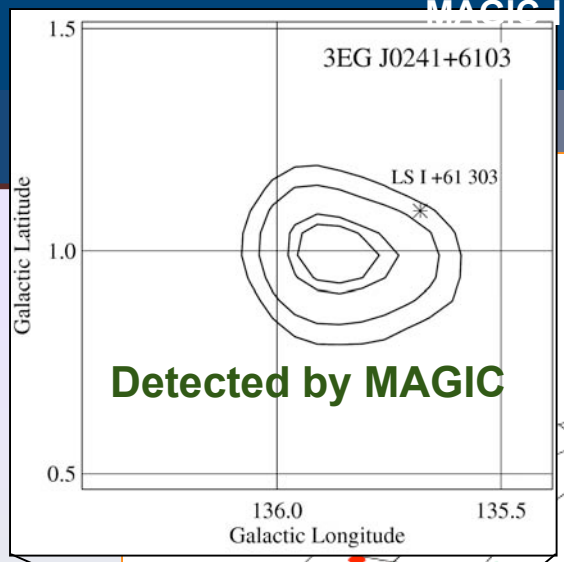
PSR 1951+32/CTB80

Upper limits to the steady emission: below theoretical predictions

Upper limits to the pulsed emission imply a cutoff energy <32 GeV





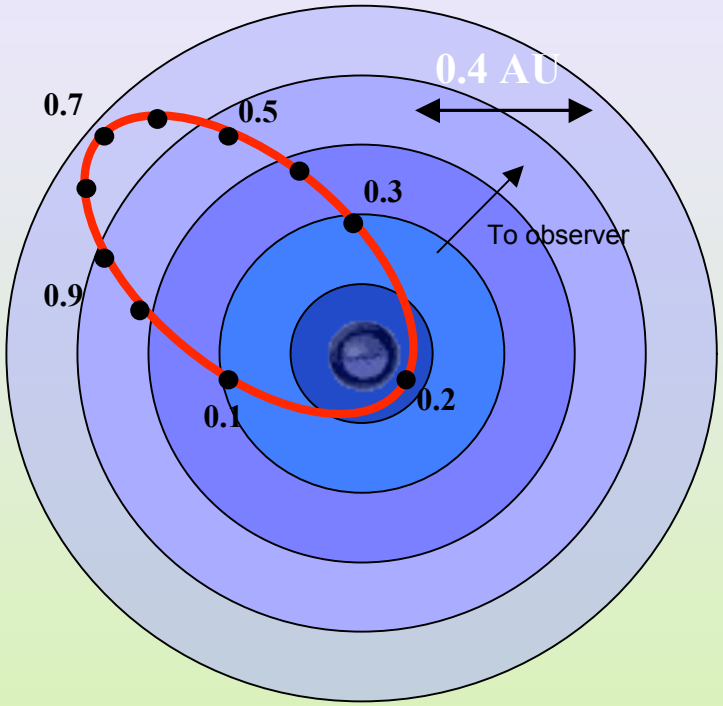


Detected by MAGIC

Detected by HESS

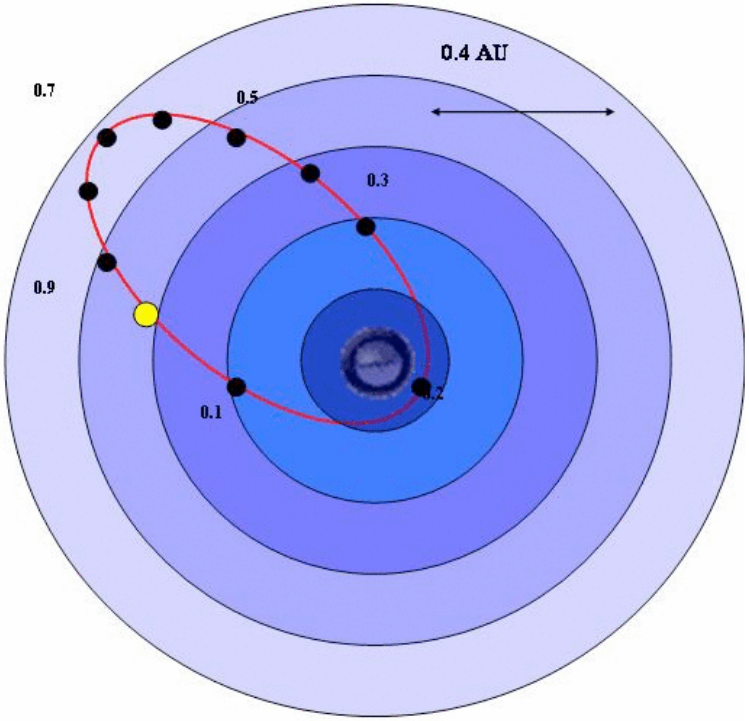
LSI +61 303

- **High Mass X-ray binary at a distance of 2 kpc**
- **Optical companion is a B0 Be star of 10.7^m with a circumstellar disc**
- **Compact object probably a neutron star**
- **High eccentricity or the orbit (0.7)**
- **Modulation of the emission from radio to X-rays with period 26.5 days attributed to orbital period**

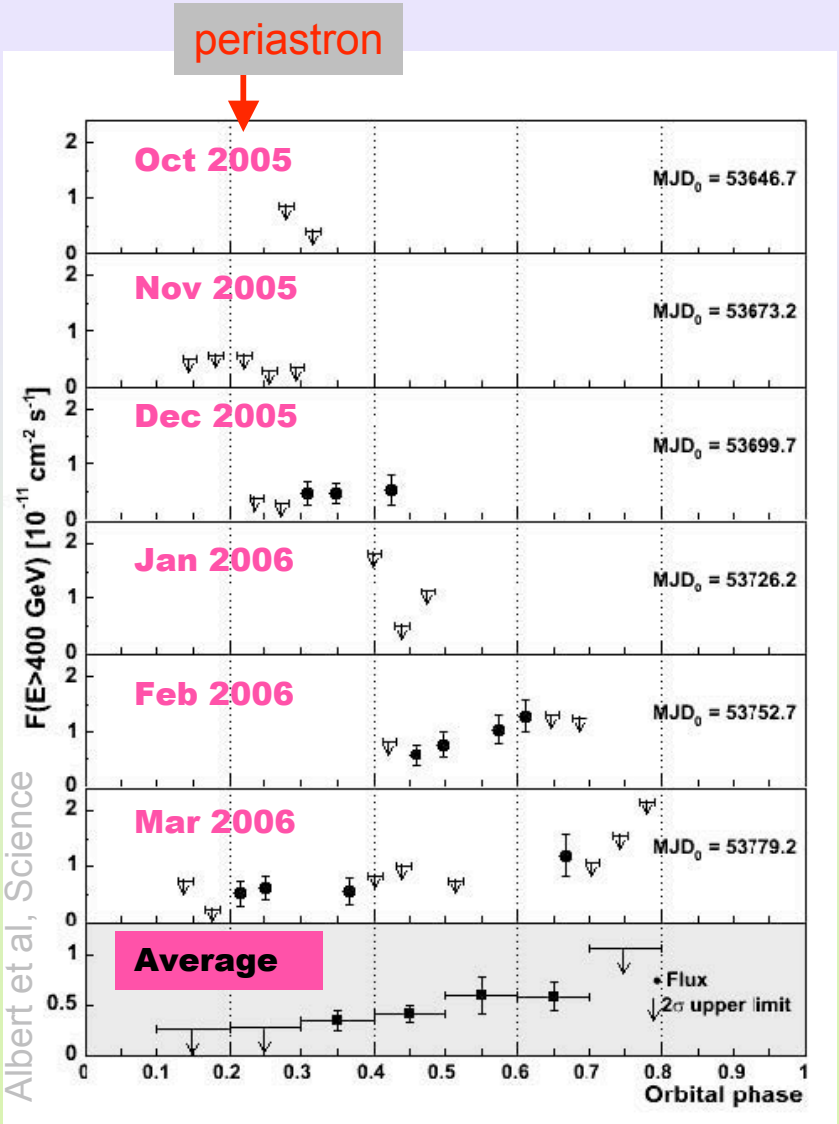


LSI +61 303

- **MAGIC observed the source for six orbital cycles in 2005-2006.**
- **Clear detection far from periastron (phases 0.4-0.7).**



LSI +61 303



No significant emission close to periastron.

Hint at periodic emission

Maximum found for phase 0.6-0.7.

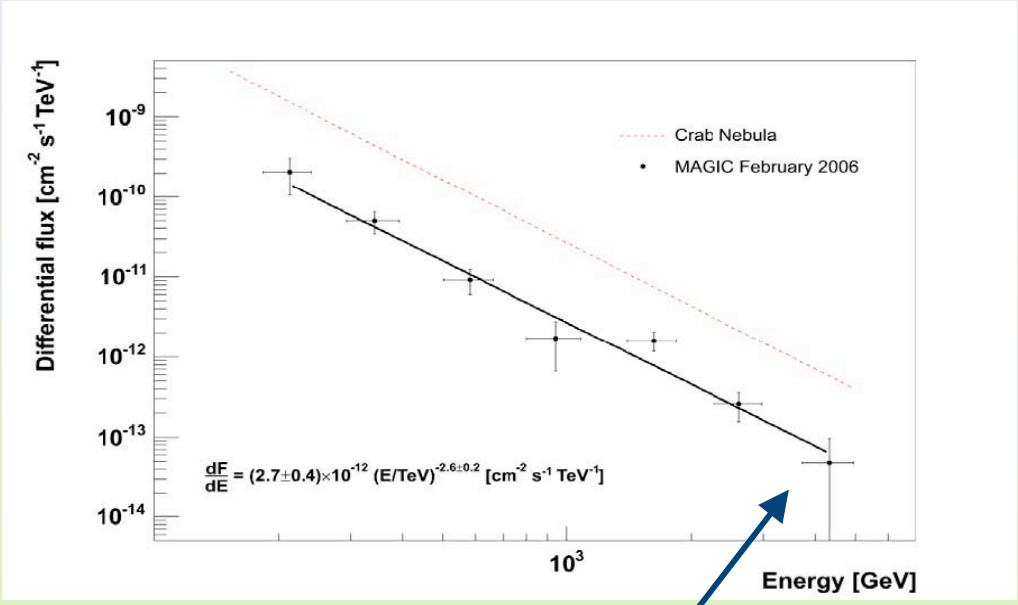
Flux at maximum 16% crab.

Maximum before periodic radio outburst at phase 0.7 (Ryle telescope).

LSI +61 303

Average Spectrum: straight power law spectrum from 400 GeV to 4 TeV:

$\alpha = -2.6 \pm 0.2\ (stat) \pm 0.2\ (syst)$

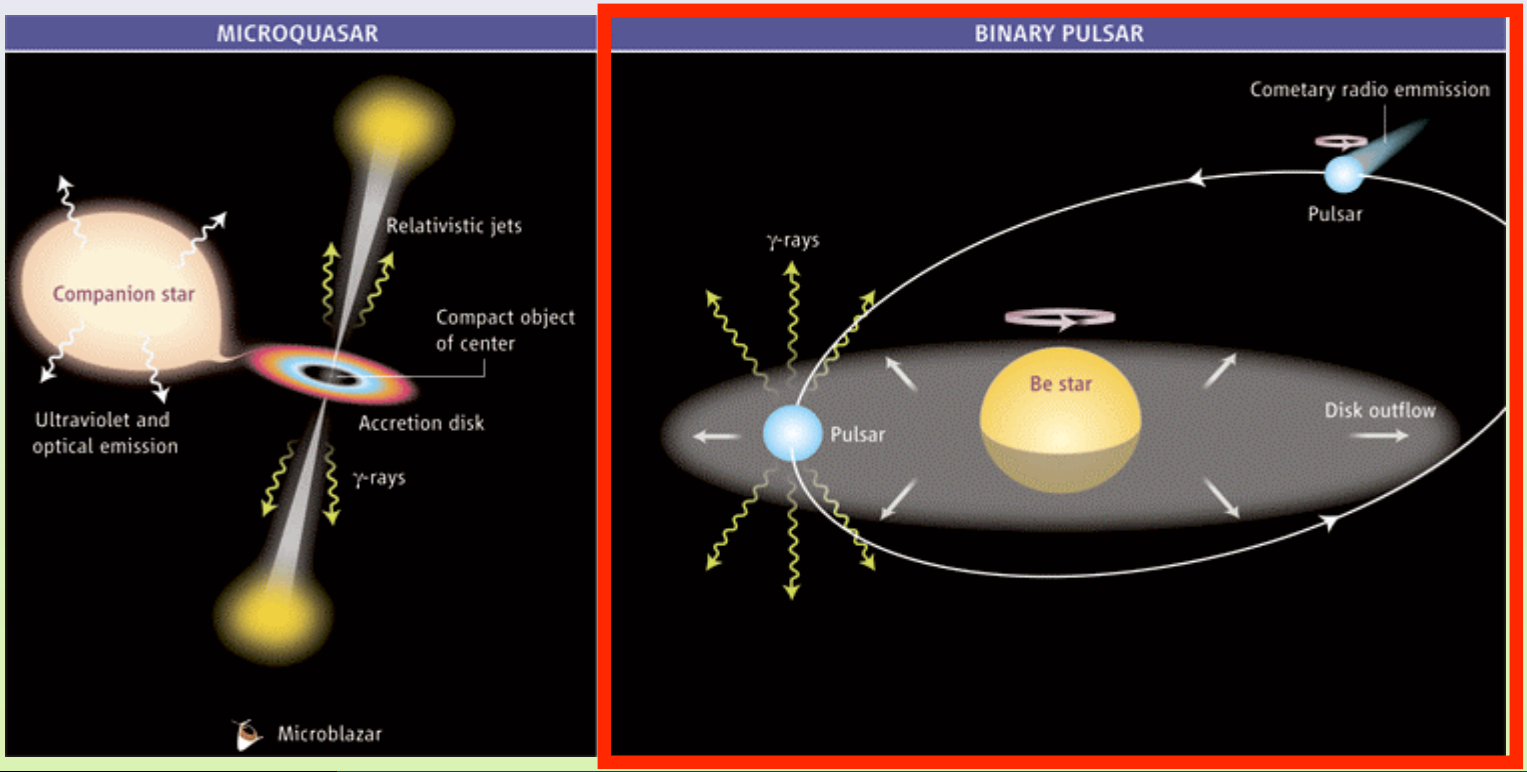


No evidence for cutoff up to 5 TeV

On the nature of LSI +61 303

Radio observations resolved a extended structure which was interpreted as a jet ⇒ microquasar?

BUT! Recent results show that the outflow could be produced by the interaction of a pulsar wind and the companion star's wind.



Conclusions

- **MAGIC is in its second year of regular observations.**
- **It is starting production of major elements of MAGIC-II: aim at completion by Fall 2007.**
- **Galactic highlight: variability of γ-ray binary LSI +61 303.**
  - **Follow up studies conducted in fall 2006 to give precisions on periodicity**
  - **First MW campaign conducted at the gamma-ray maximum (CHANDRA+MERLIN+VLBA),**
  - **Second MW campaign -including harder X-rays- programmed for 2007**
- **Reports on newly detected galactic sources waiting forthcoming data release**