XXVII International Cosmic Ray Conference @ Hamburg 10 Aug. 2001

Observation of TeV Gamma Rays from RXJ1713.7-3946

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(proxy for R.Enomoto)

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CANGAROO Collaboration

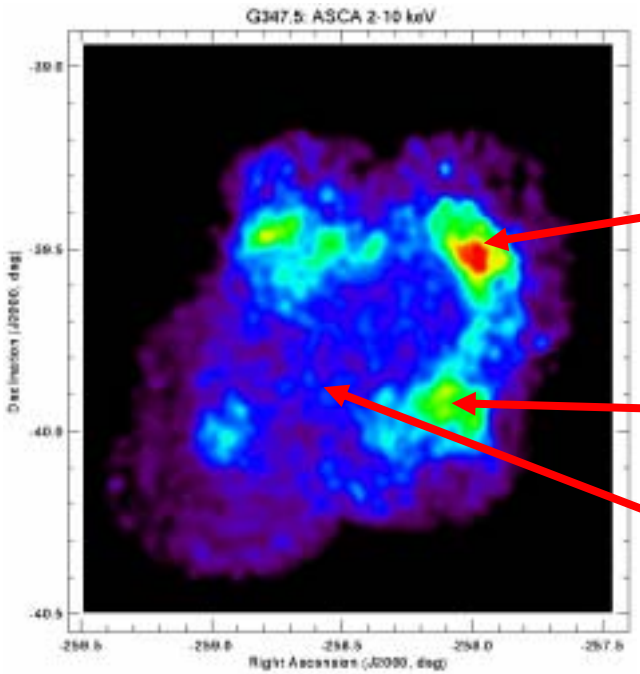
- Collaboration of Australia and Nippon for a Gamma Ray Observatory in the Outback

✧Institute for Cosmic Ray Research, U. Tokyo
✧Other 14 Japanese Institutes
✧University of Adelaide
✧Australian National University

Site: South Australia, Woomera

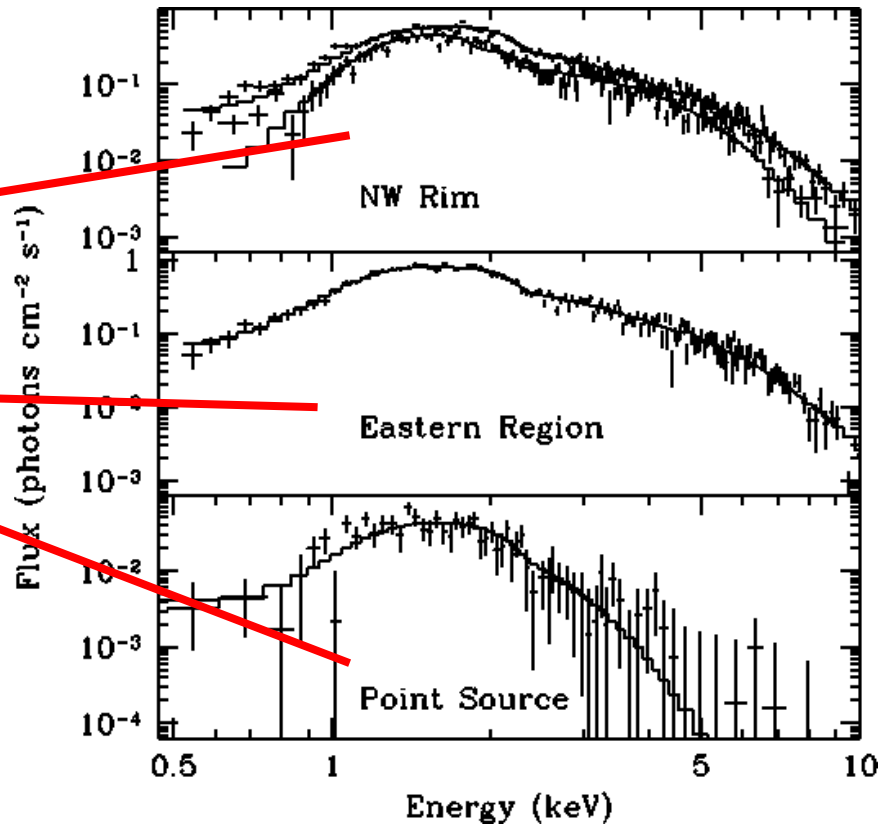
31° 06' S
136° 47' E
160m a.s.l.

ASCA X-ray Observation of RXJ1713,7-3946



Synch. X-ray Emission(ASCA)

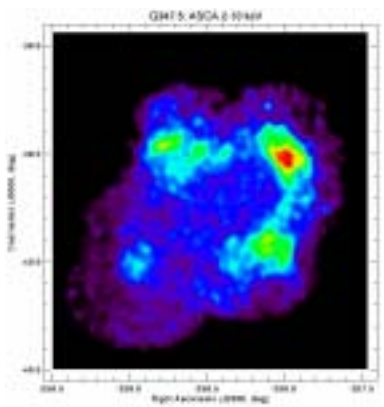
Tomida, Ph.D., 1999



Slane et al, ApJ, 525,1999

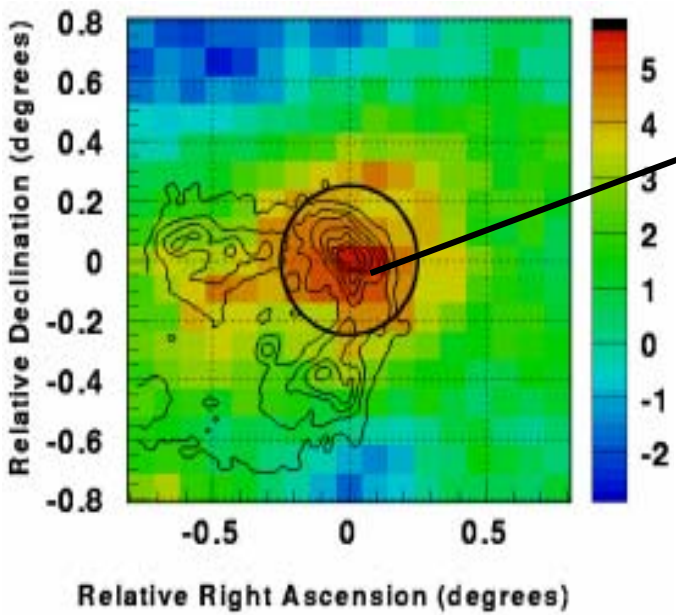
CANGAROO III

TeV gamma rays from RXJ1713

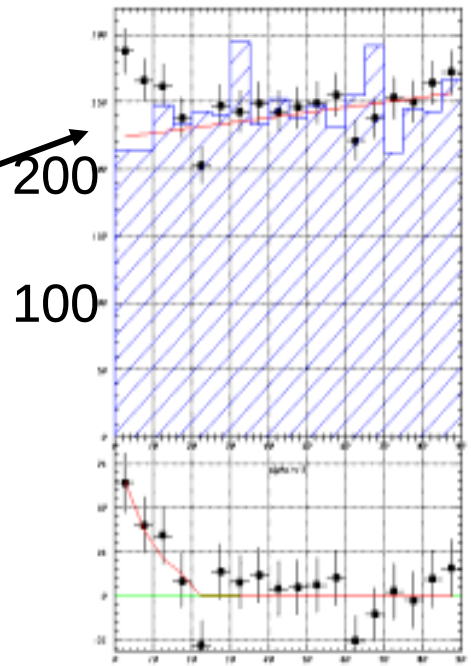


RXJ1713.7-3946

Synch. X-ray Emission(ASCA)



TeV-Gamma 3.8m Tele.



7m Tele. 1999 (16hours))

$E\gamma > \sim 1TeV\ (E^{-2.5})$

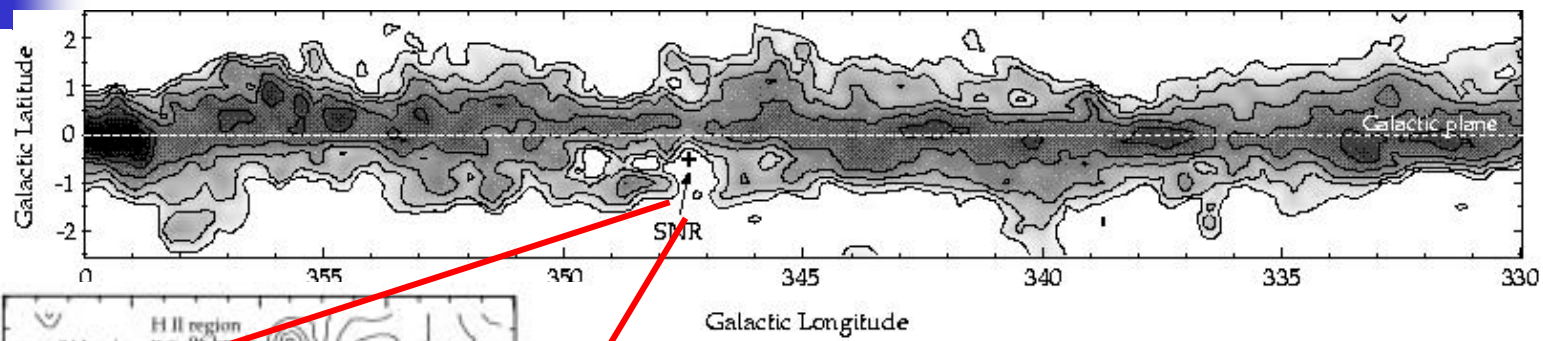
Tomida, Ph.D., 1999

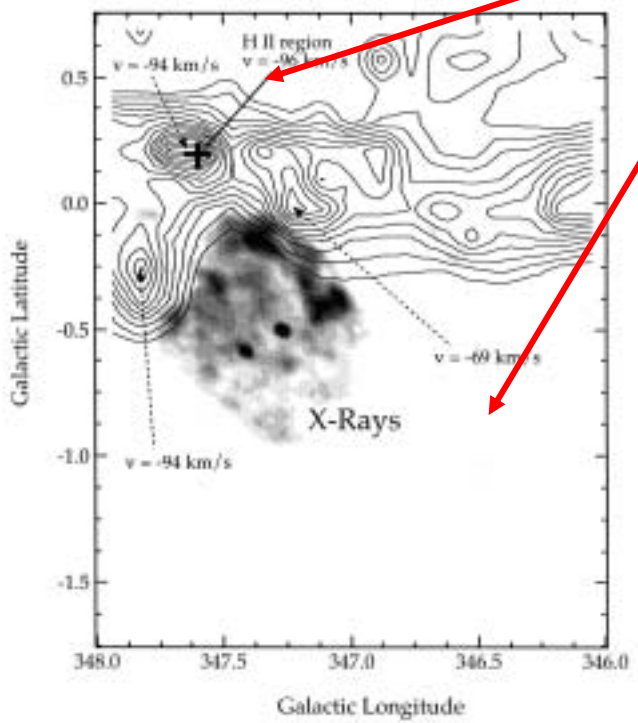
Muraishi et al., A&Ap 354, 2000

Proximity of RXJ1713.7-3946

CANGAROO III

Slane et al, ApJ, 525,1999



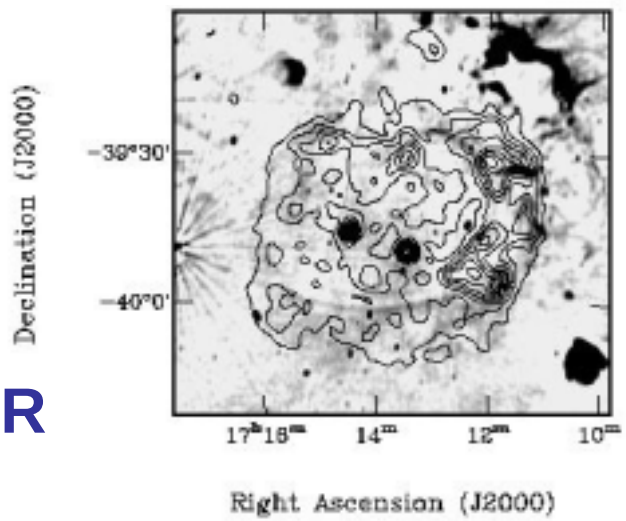


Galactic plane

CO Image

Dist. ~6kpsc

Density in SNR <<1atom/cm^{-3}

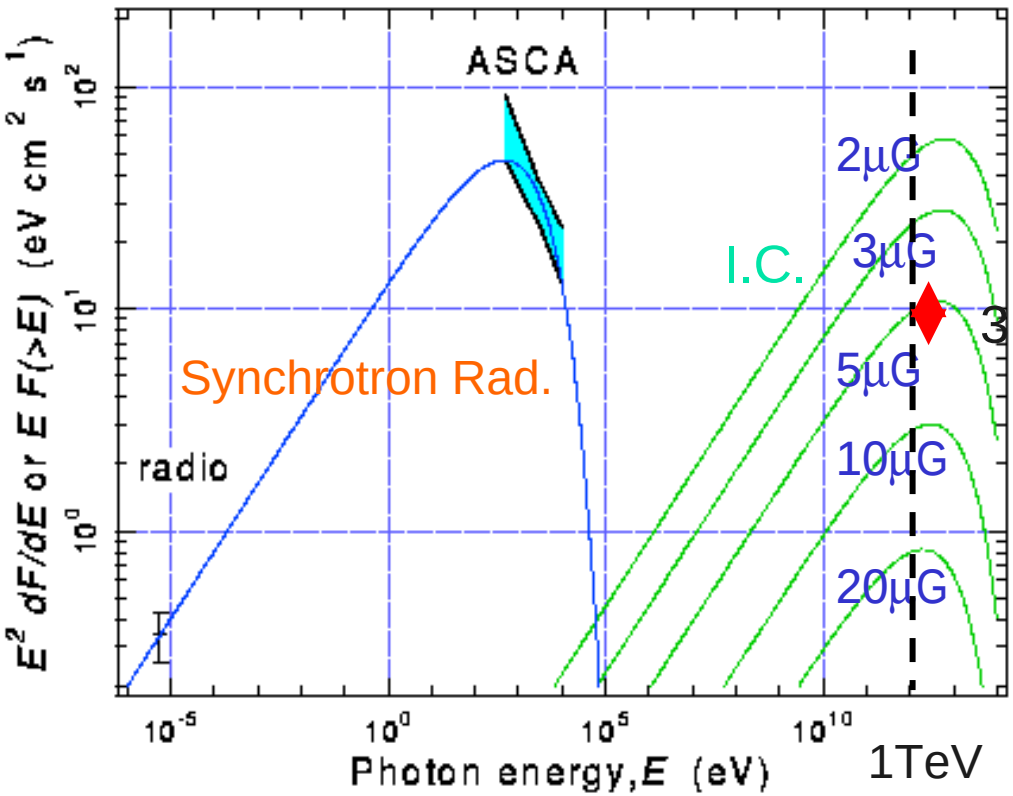


Radio Image @843MHz

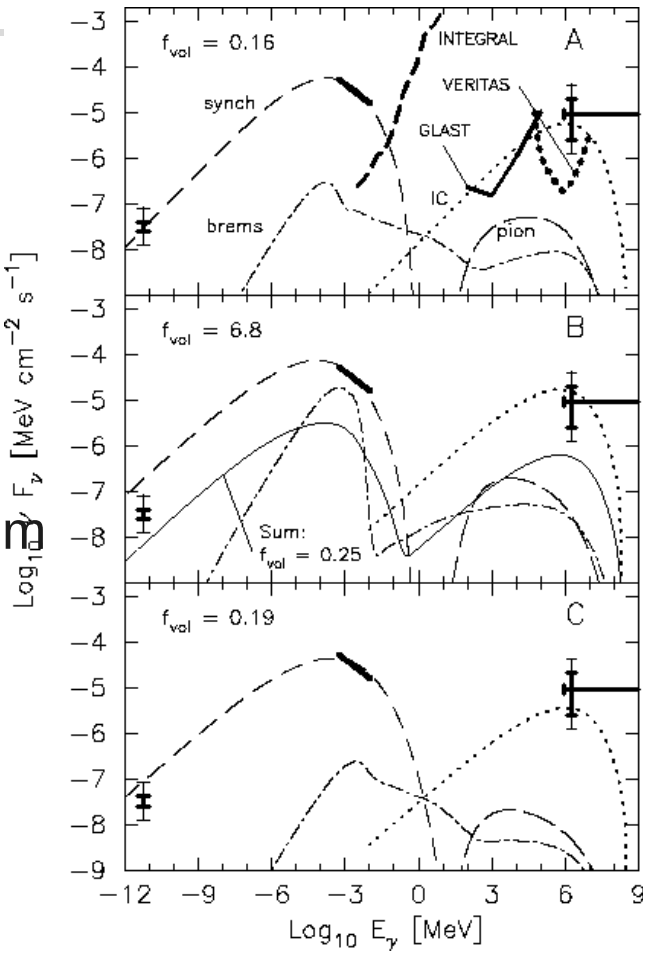
Expected TeV γ Rays from Synchrotron-I.C. model

CANGAROO III

Naito et al 2001(CANGAROO)



Ellison et al 2001



Observation of RXJ1713.7-3946

- 7mϕ telescope
- Eγ > ~1TeV ($E^{-2.5}$)
- August 1999,

→

- 10mϕ telescope
- Eγ > 400GeV ($E^{-2.5}$)
- July, August 2000

On -1419m, Off- 1397m

Zenith<30^{O} no cloud,dew

On – 649m, Off - 642m

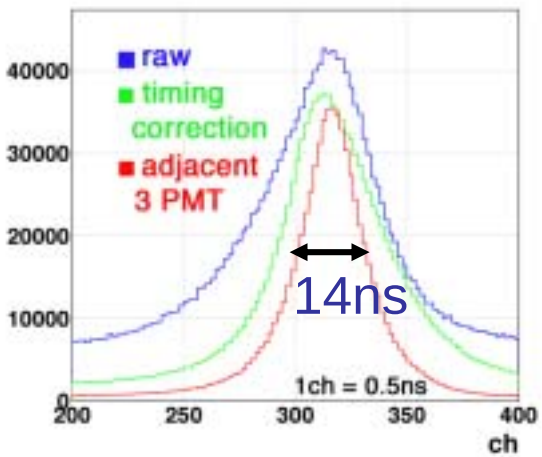
Observation Point

NW rim @ Max. of X-ray(ASCA)

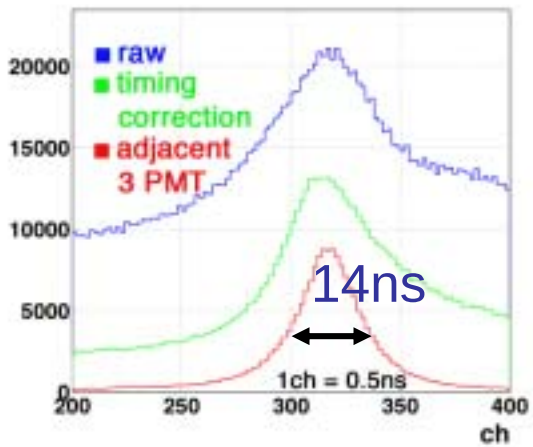
(17h,11m,56,7s -39^{o} 31'52.4'' (J2000))

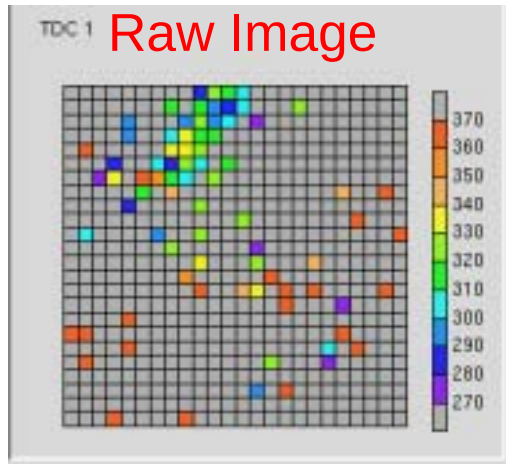
Analysis

PSR1706OFF



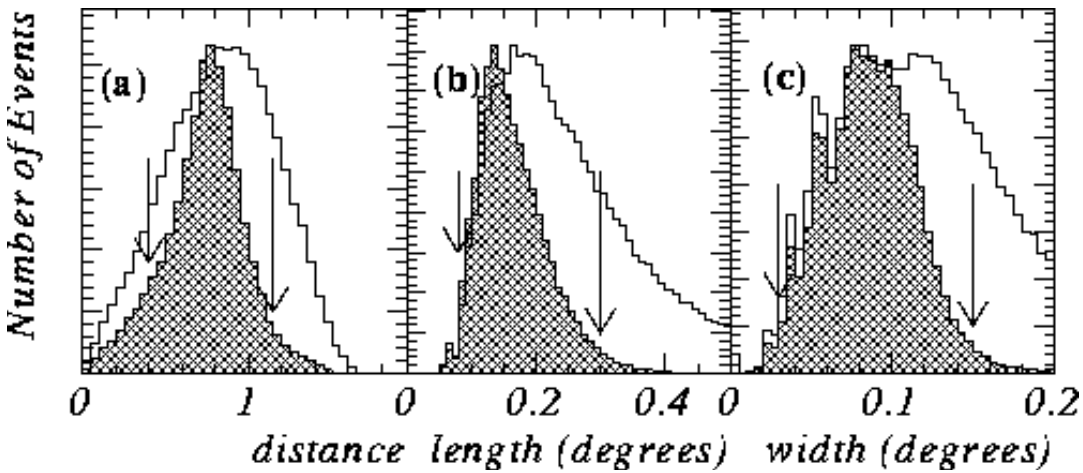
PSR1706ON

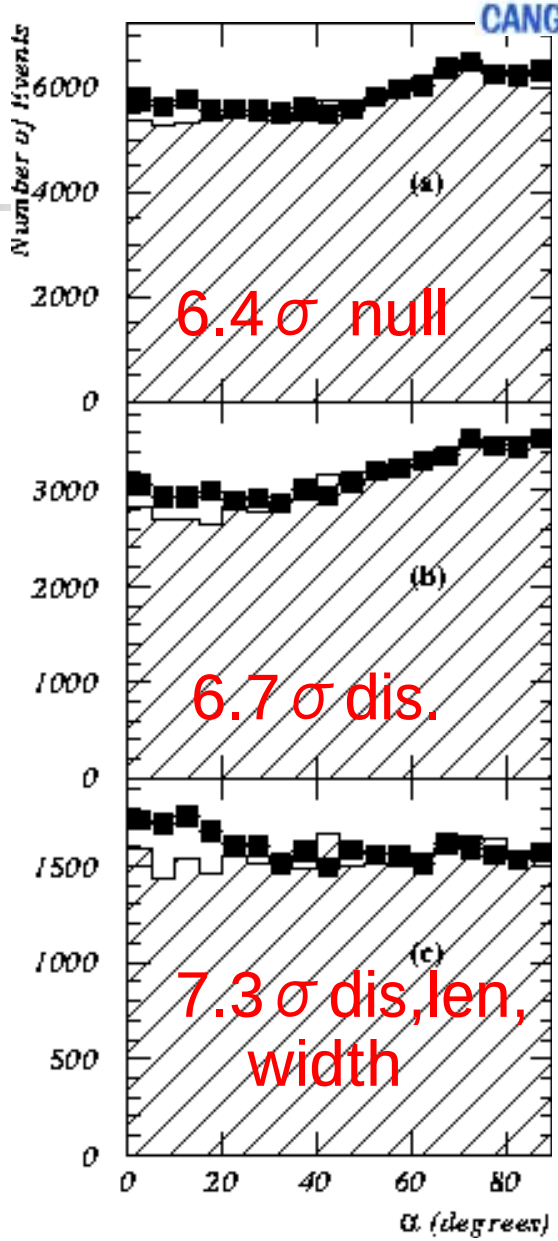




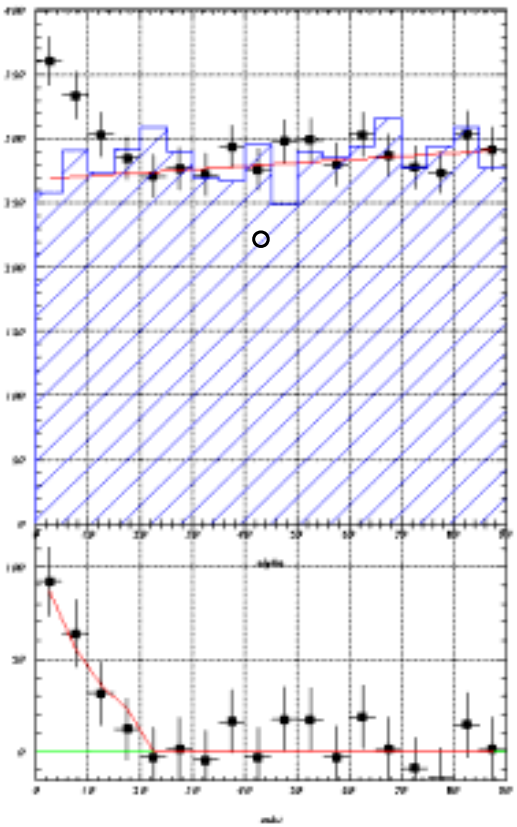
- >3.3 p.e. for each PMT
- 40ns timing gate
- 5 adjacent hit PMTs

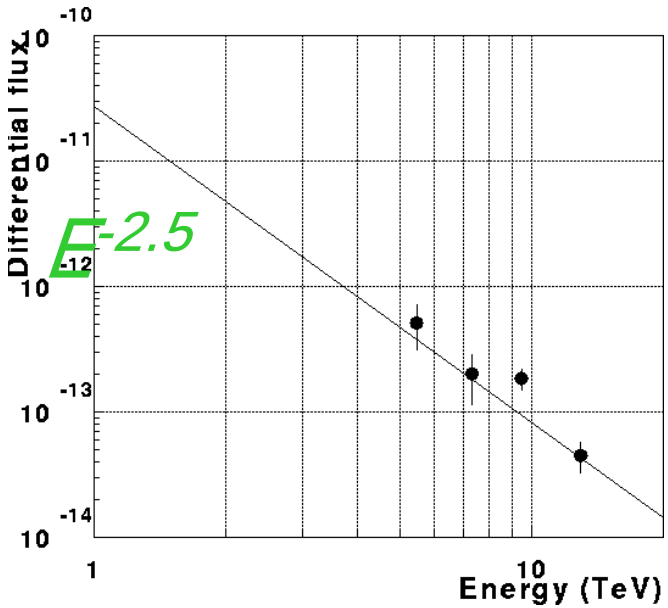
Imaging Analysis (Conventional Cuts)





Consistency Check using Crab



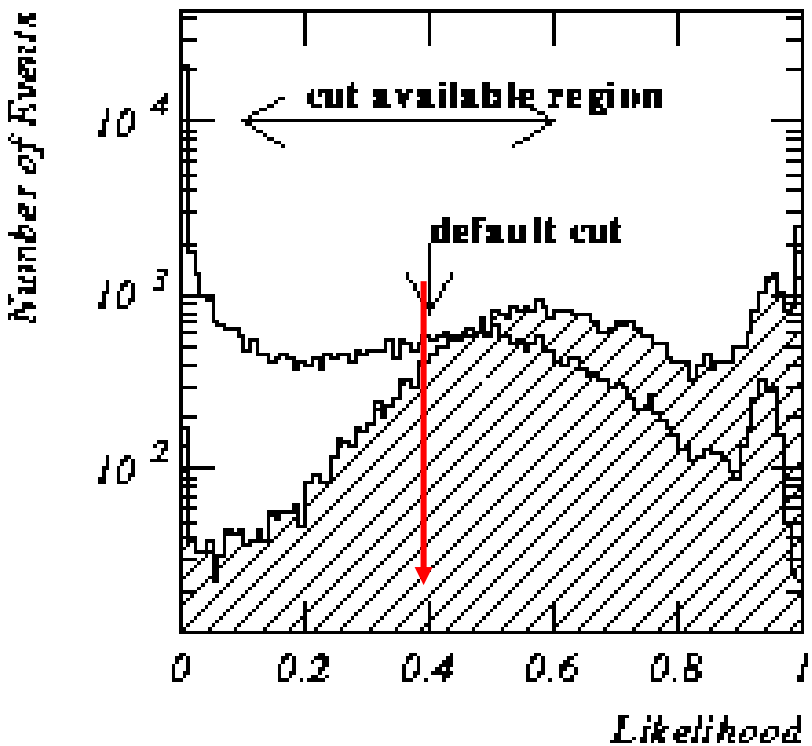


Crab(~40hours)

Likelihood method for Imaging

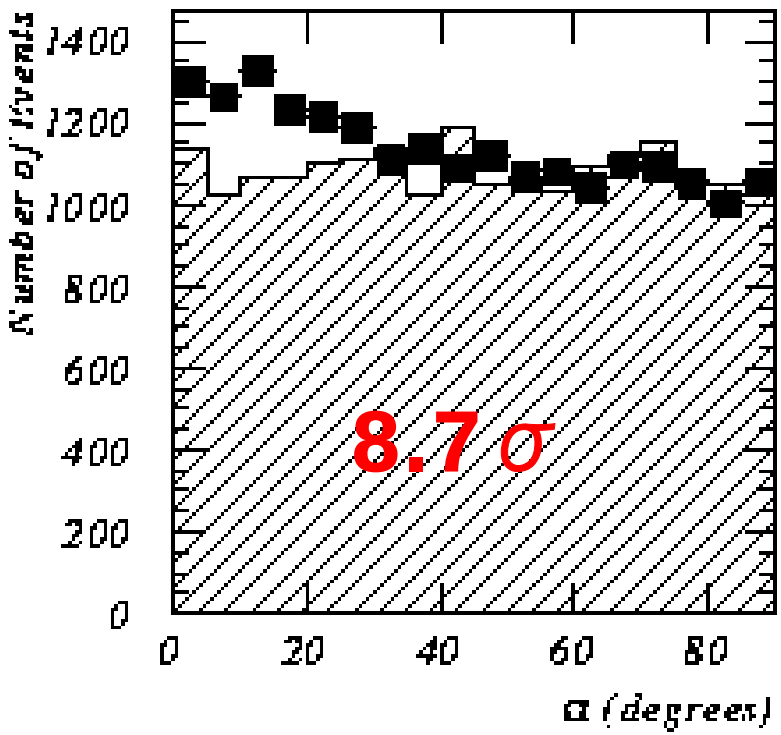
Simulated gamma rays

OFF-source



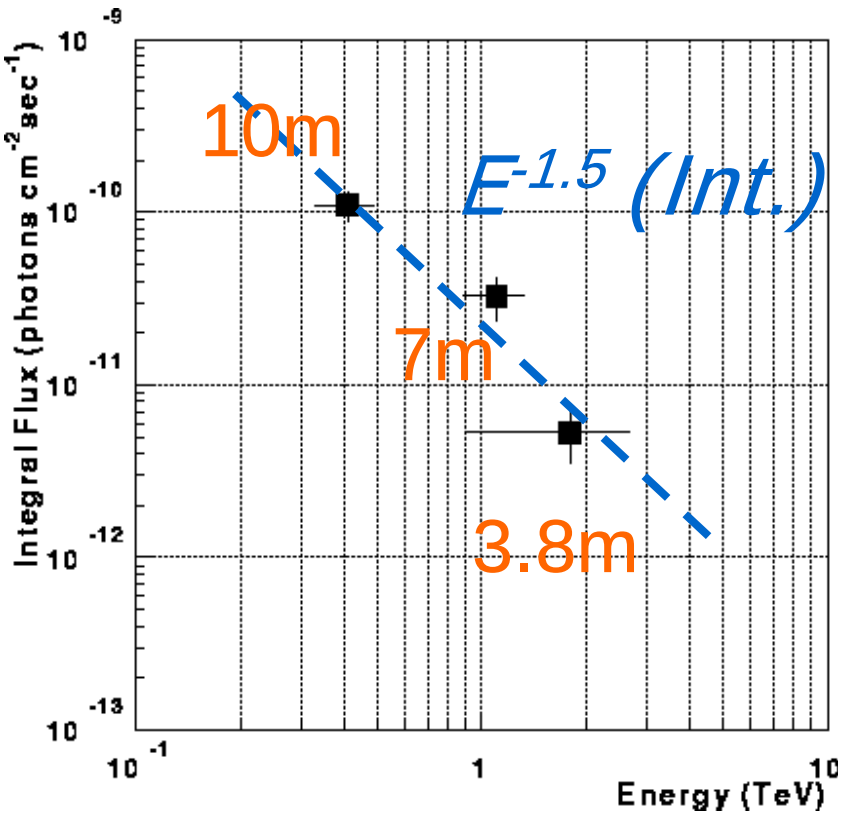
Off-source

On-source

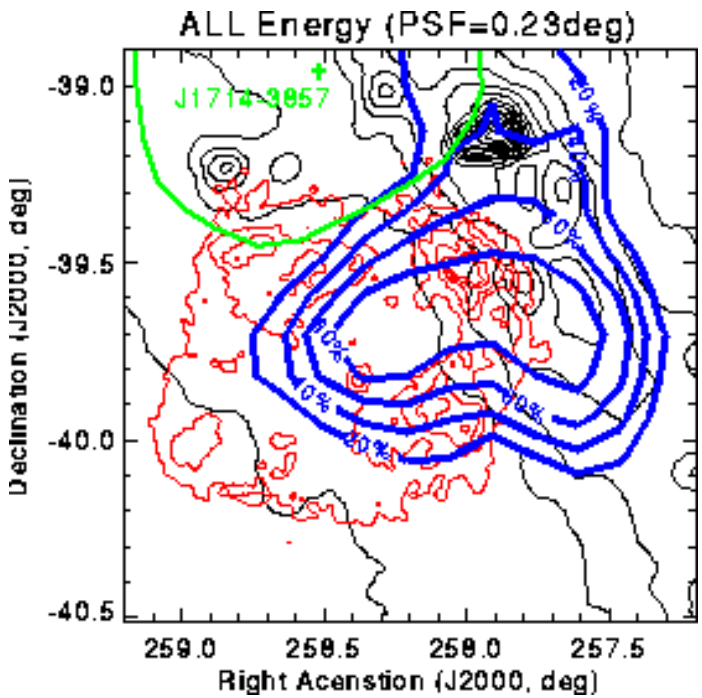


Results of 2000 Observation

Integral fluxes



Significance Map



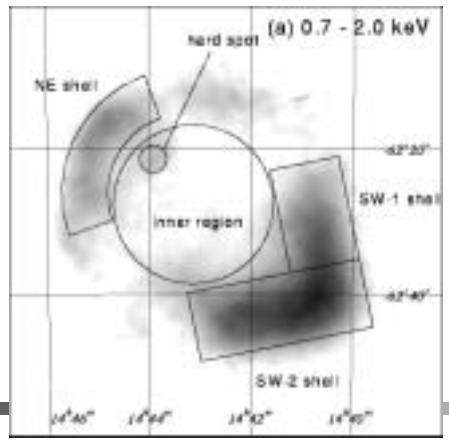
Summary

- Reconfirmation of TeV gamma-ray emission from RXJ1713 with $>8\sigma$ **(>400 GeV)**
- Integral flux ~ **$1.1 \times 10^{-10} cm^{-2} s^{-1}$ (>400GeV)** with index of **~1.5**
- **Strongest TeV gamma-ray Source** in Southern Hemisphere
- Full data will be soon submitted.

X-ray Synchrotron SNRs

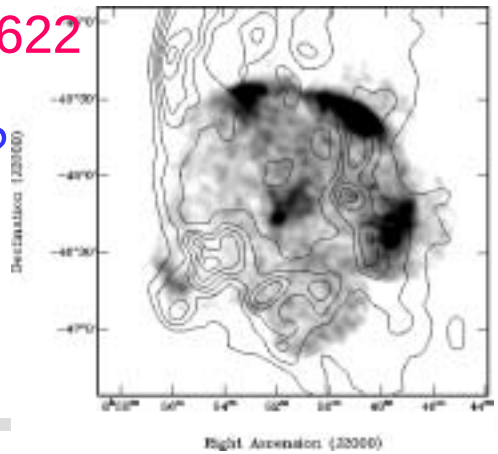
RXW86

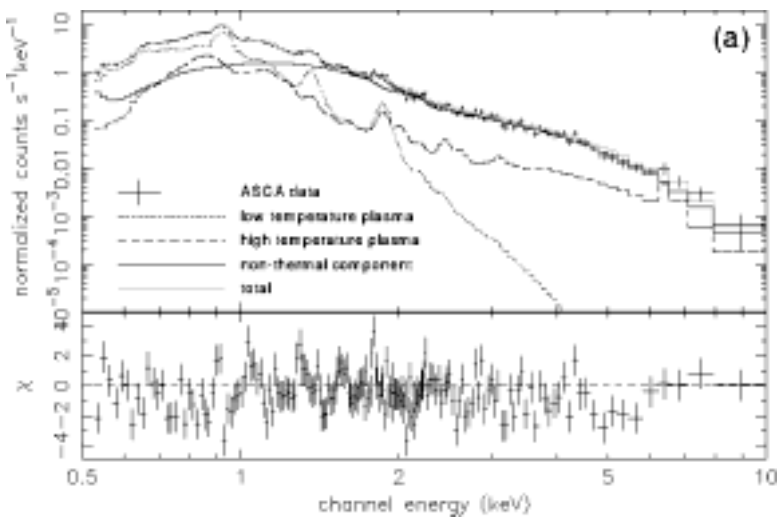
Dist. a few Kpc
Type II



RX J0852-4622

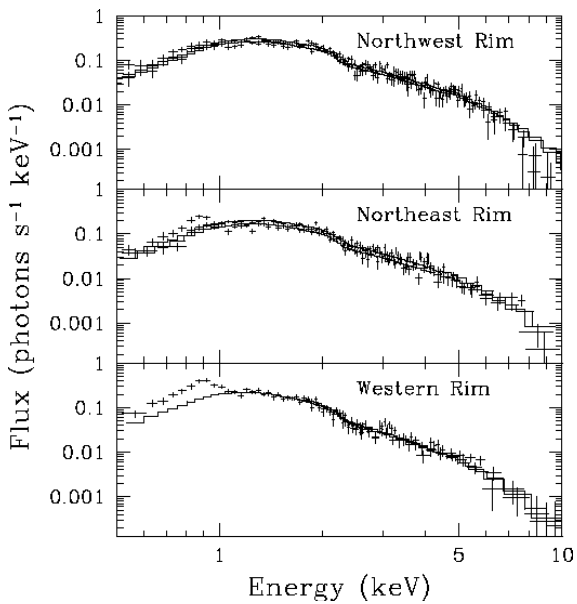
Dist >1kpc?





Bamba et al. 2000

ASCA Results



Slane et al. 2001