A question

- Can GLAST detect non-blazar AGN?



GLAST and (other) AGN

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Who are the “others” ?

Certainty:

- Radio galaxies (mis-aligned blazars)

Possibility:

- LINERs

Speculation:

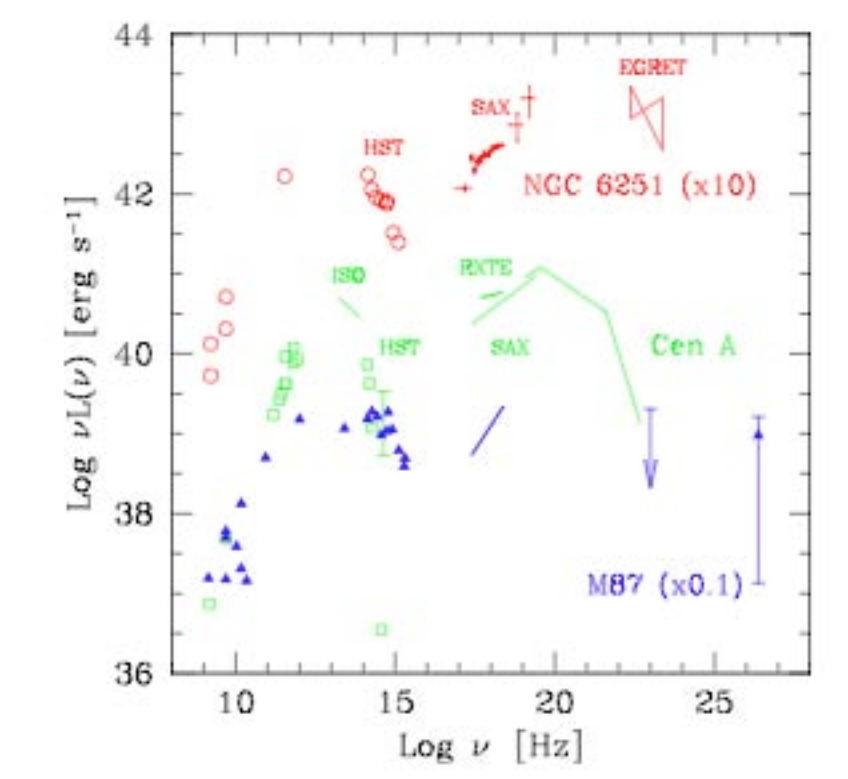
- Seyferts

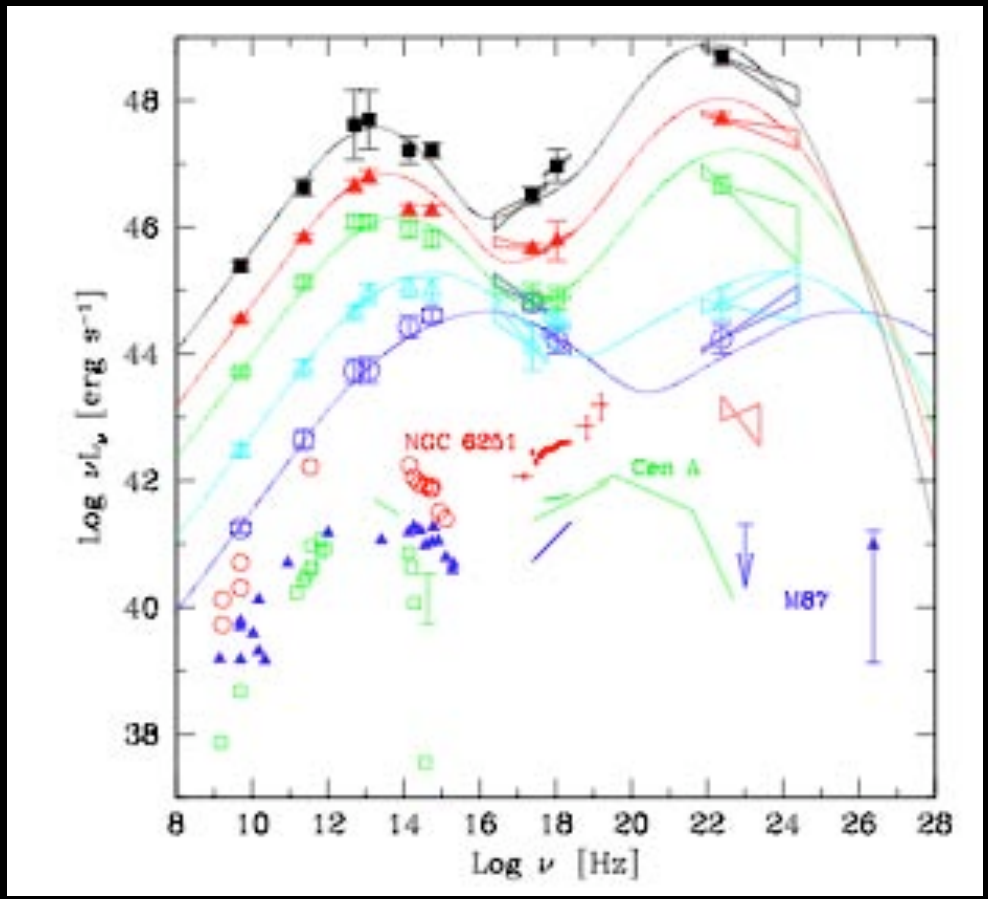
Radio Galaxies

- Two already detected with EGRET: Centaurus A and NGC 6251
- TeV detection of M87: core or HST-1?

- Variability: core most likely candidate

Spectral Energy Distributions





Ghisellini et al. 2004

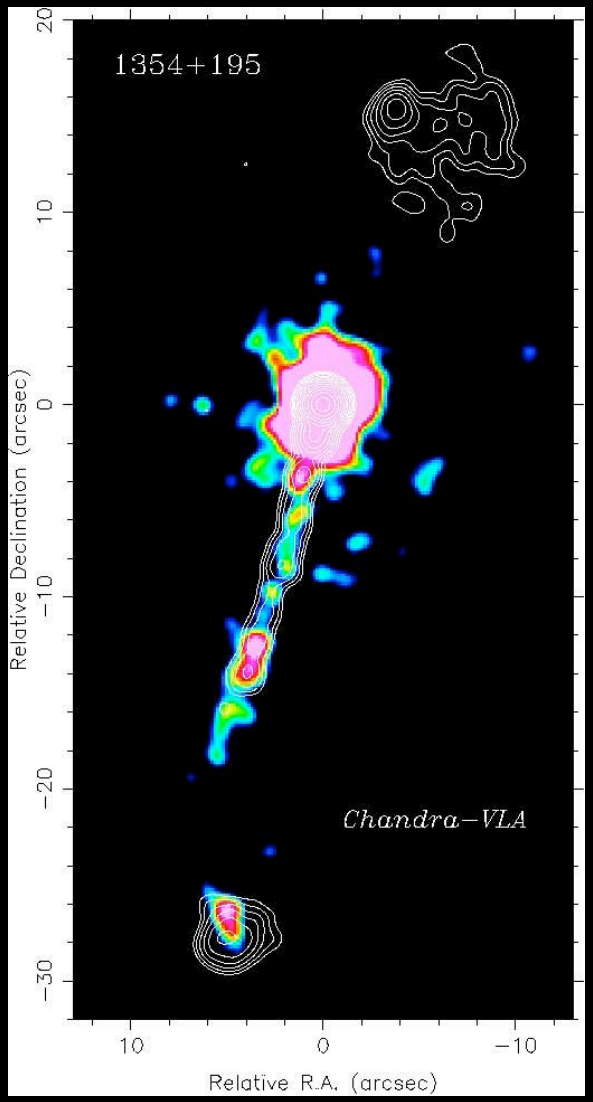
Theoretical Expectations

Ghisellini, Tavecchio, & Chiaberge 2004:

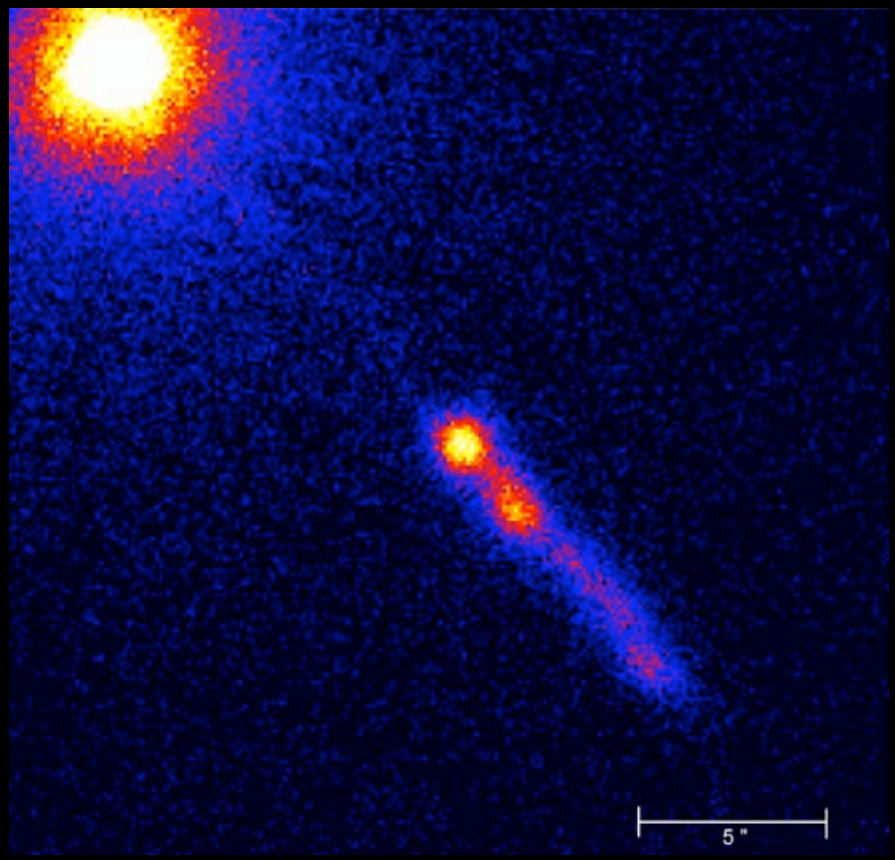
- Assume a structured jet: fast spine+slow layer
- Each sees beamed radiation from the other
- Layer's IC emission enhanced

- Predict GeV from 30 FRIs, > 10^-12 erg/cm2/s

Chandra Jets in FRIIs

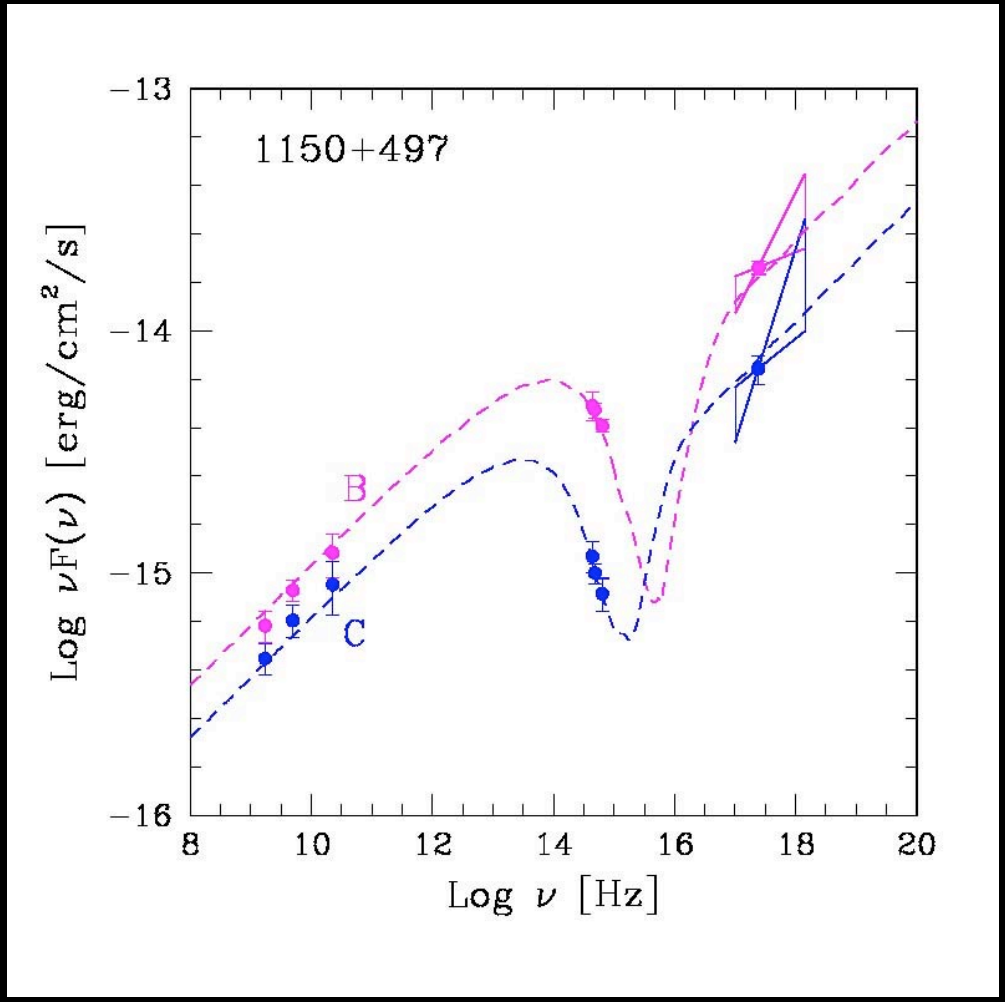


RMS et al 2002



Marshall et al 2000

Jet SED

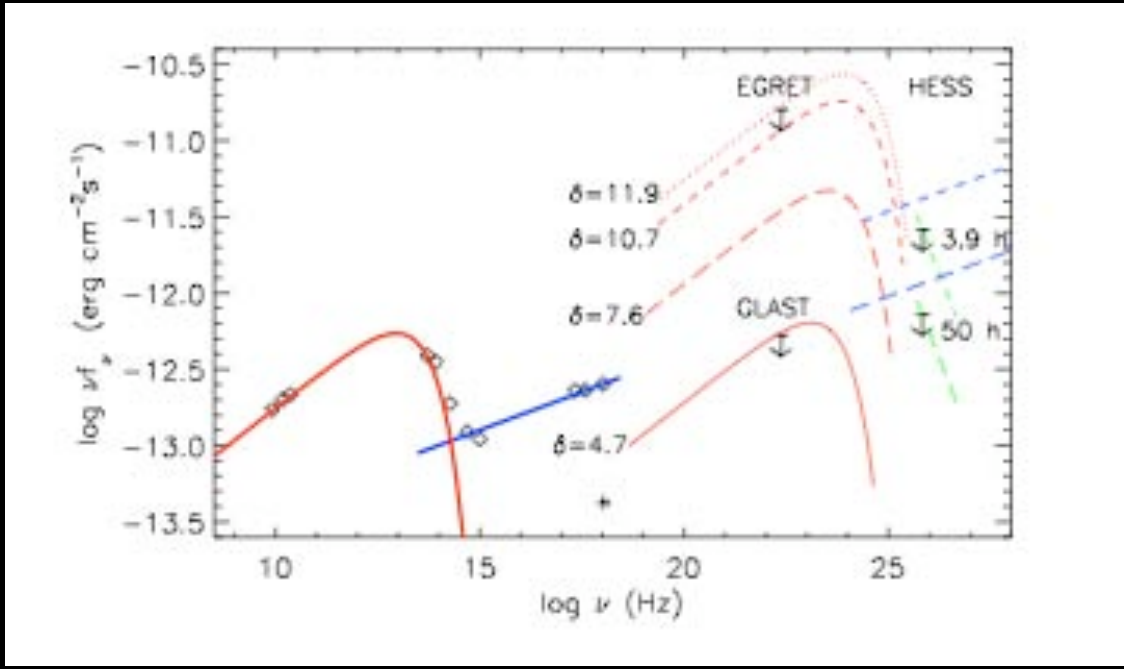


Rising X-ray spectrum : A lot more luminosity at higher energies!!

RMS et al 2006

Radio Galaxies: Jets

- Models: IC/CMB or SSC or Synchrotron?
- GLAST detection can discriminate and constrain the beaming factor



Georganopoulos et al. 2006

Feasibility

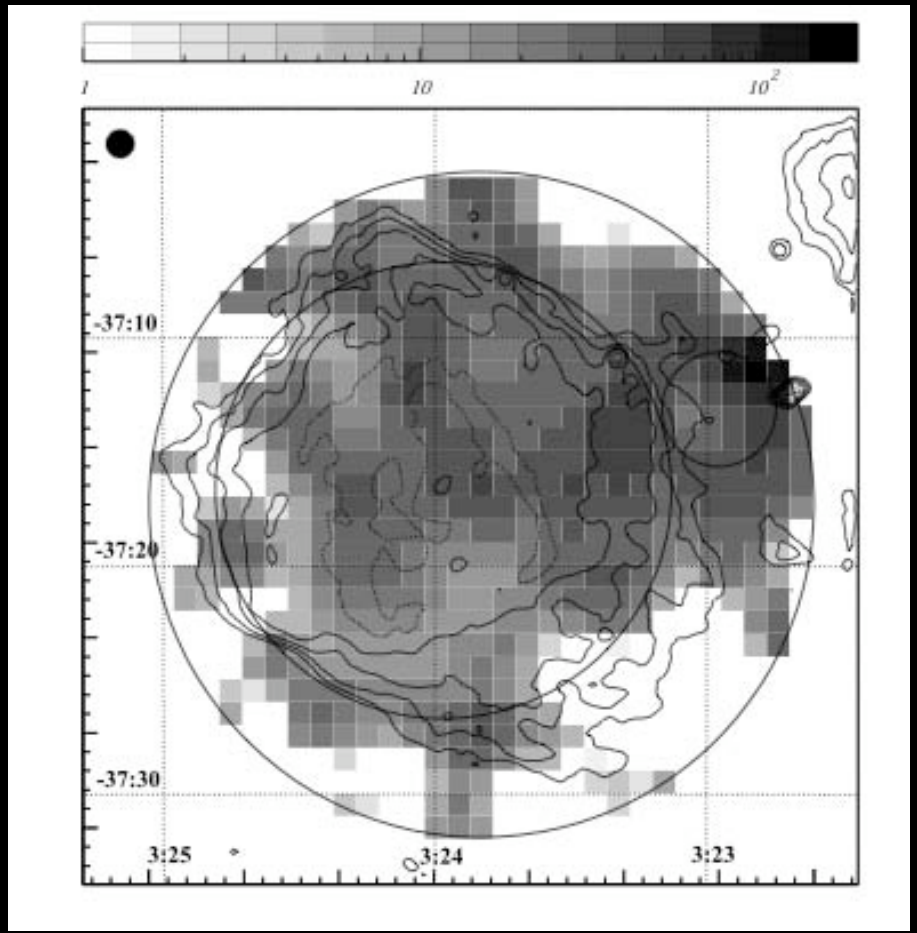
- Main issue: Core is a powerful blazar!

- Need: weak/low-state core and/or variability
- But GeV flux is AT LEAST an upper limit to jet (Georganopolous et al. 2006)

- Also PSF subtraction and image reconstruction algorithms (in progress)

Radio Galaxies: Lobes

- X-ray emission from the East lobe of Fornax A (d=18Mpc)



Isobe et al 2006

Gamma-rays from the East lobe of Fornax A?

- X-ray emission from the East lobe of Fornax A: IC off the CMB
- Electron energy and magnetic field constrained
- IF electron distribution continues unbroken to $\gamma = 10^6$

F = 1-4 x 10^-11 ergs/cm/s in 100 MeV-1 GeV

SgrA* and LINERs

- Jets or ADAFs ?
- Either way, gamma-rays possible
- SgrA* detected with EGRET and TeV

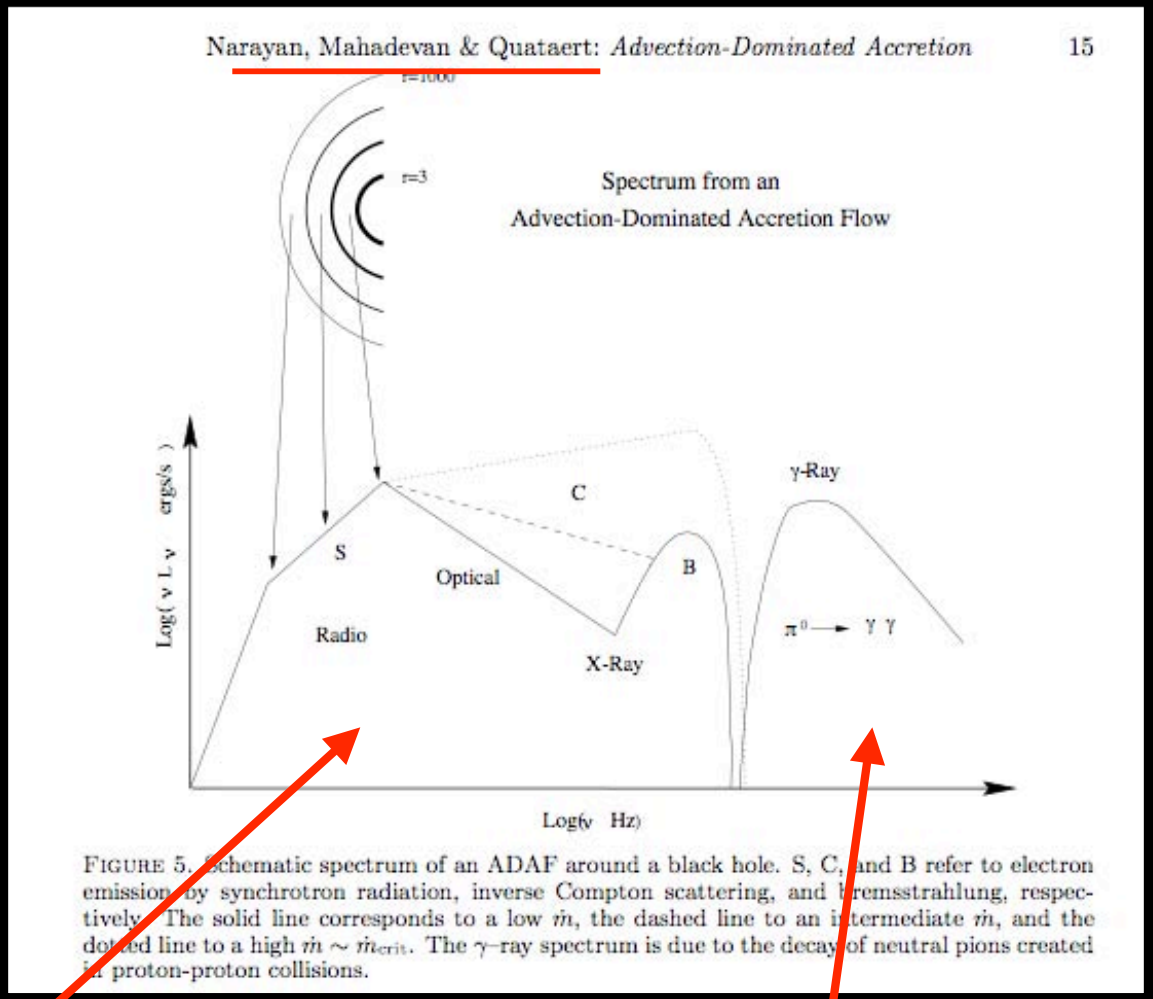
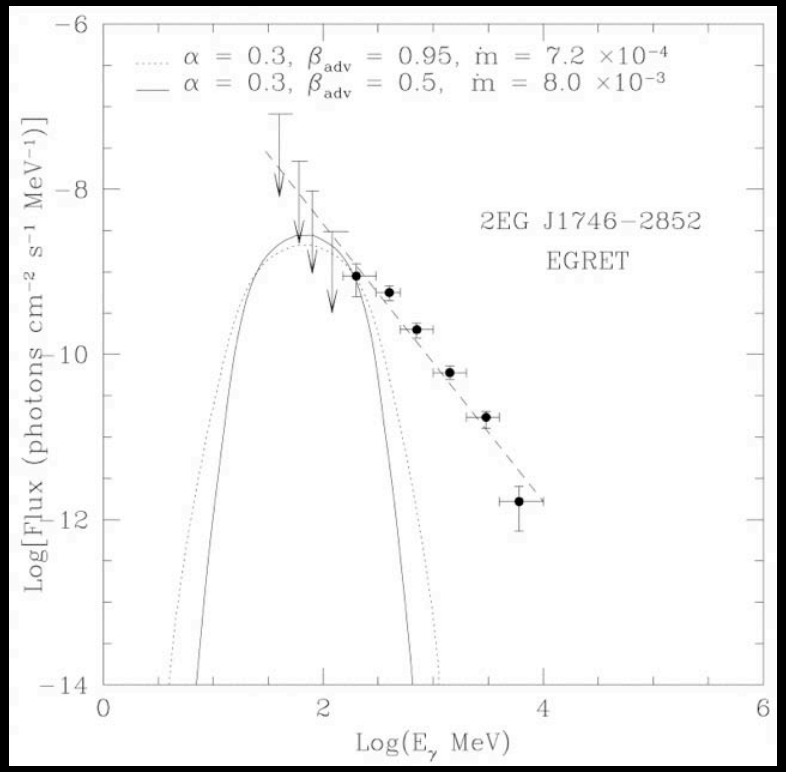


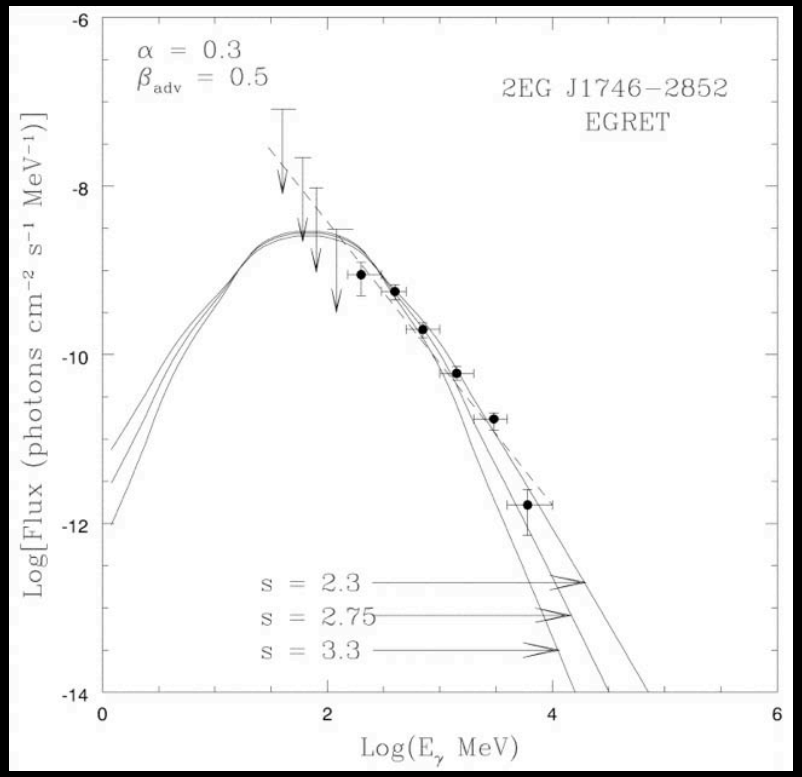
FIGURE 5. Schematic spectrum of an ADAF around a black hole. S, C, and B refer to electron emission by synchrotron radiation, inverse Compton scattering, and bremsstrahlung, respectively. The solid line corresponds to a low $\dot{m}$, the dashed line to an intermediate $\dot{m}$, and the dotted line to a high $\dot{m} \sim \dot{m}_{\rm crit}$. The γ-ray spectrum is due to the decay of neutral pions created in proton-proton collisions.

Electrons, T=10^9 K

Protons, T=10^12 K

Gamma-rays from ADAFs: Proton probe





Thermal proton distribution

Powerlaw proton distribution

Mahadevan et al. 1997

Gamma-rays from ADAFs: Predictions

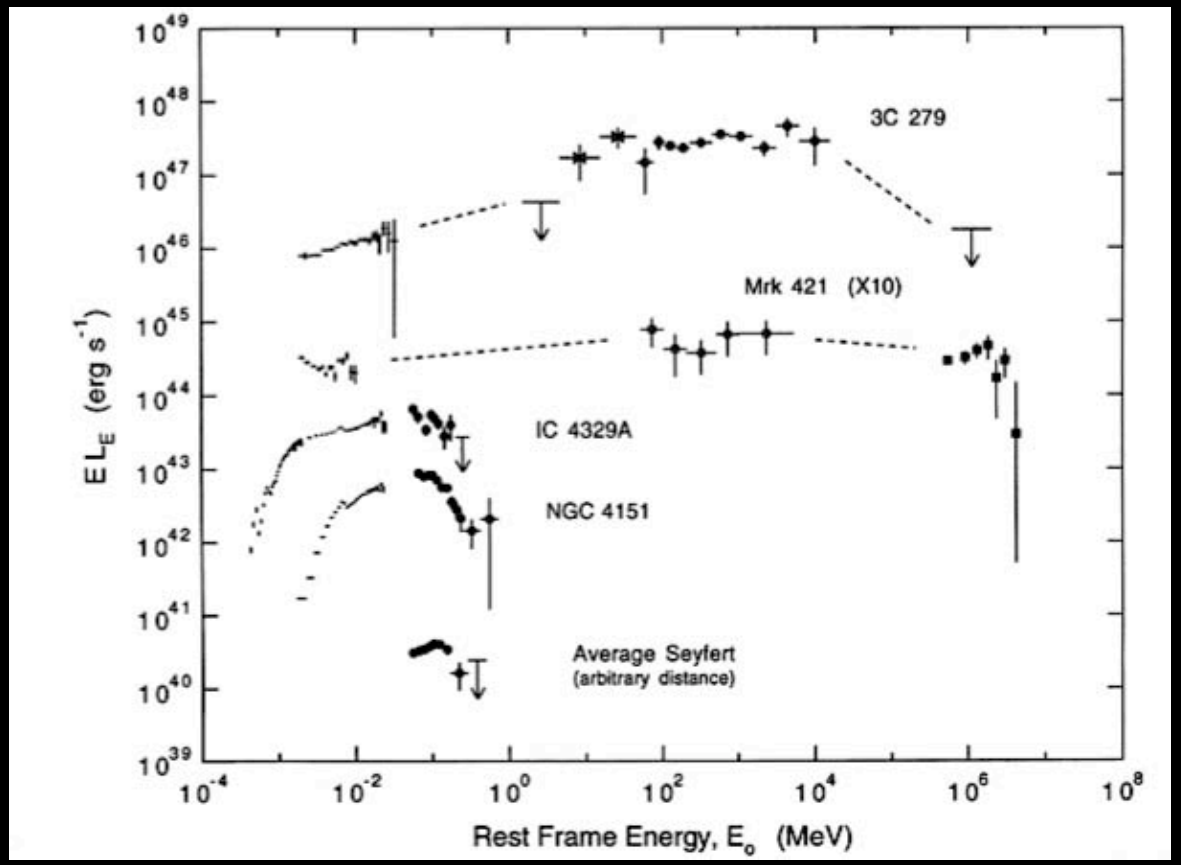
TABLE 5
FLUXOF PHOTONSABOVE 100 MeV FROM VARIOUS ACCRETING BLACK HOLESWITH ADAFS

Name	α	β_{adv}	m	$\dot{m}$	D_{kpc}	Flux (photons cm^{-2} s^{-1})
Sgr A*...	0.3	0.5	2.45×10^{6}	5.2×10^{-4}	8.5	4.9×10^{-7}
A0620-00...	0.3	0.5	6	1.2×10^{-3}	1	2.8×10^{-9}
V404 Cyg...	0.3	0.5	12	4.6×10^{-3}	3	1.5×10^{-9}
NGC 4486...	0.3	0.5	3×10^{9}	$10^{-2.5}$	16×10^{3}	6×10^{-9}
NGC 4258...	0.3	0.95	3.6×10^{7}	10^{-2}	6.5×10^{3}	1.4×10^{-9}

Mahadevan et al. 1997

Seyferts

- Seyferts?!?



Dermer & Gehrels 1995

Yes, but…

- Near-relativistic X-ray outflows!!
- Possible compact and variable X-ray source "jet-like" (Fabian, MCG 6-30-15)
- Starburst component
- Calculations, anyone?

Conclusion

AGN and GLAST:
expect new (great!) science