GLAST and Galaxy Clusters

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Why do we expect X-rays from Clusters?

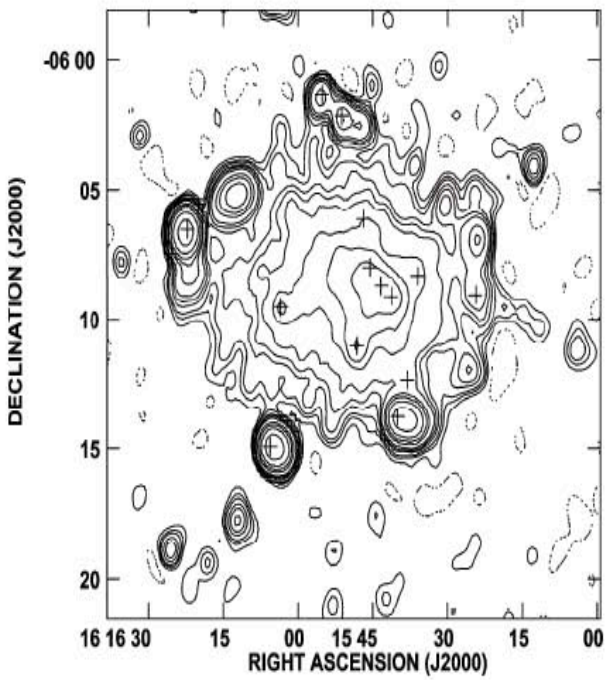
Clusters should contain a large reservoir of energetic non-thermal particles from:

- Embedded AGN
- Merger Shocks
- Diffusion from galaxies

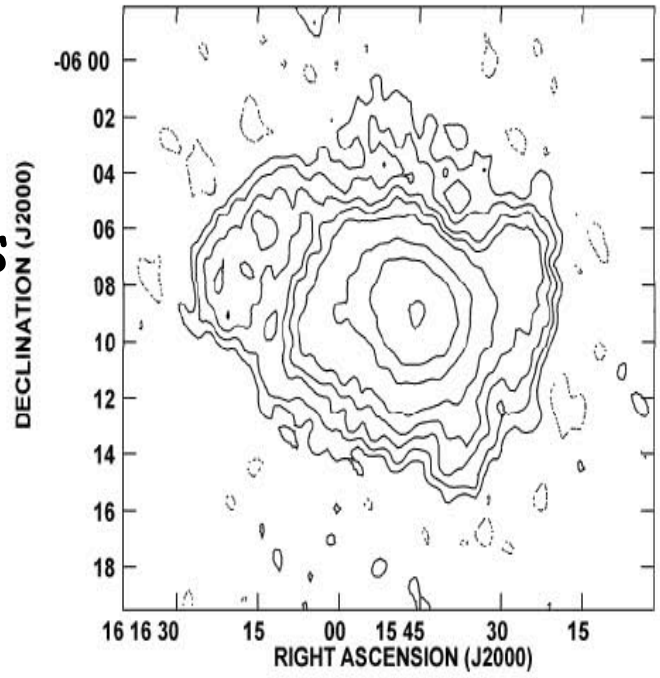
Evidence for non-thermal emission-

- Radio Halos
- Excess EUV emission
- Non-Thermal X-ray emission

Evidence for non-thermal emission- Radio Halos



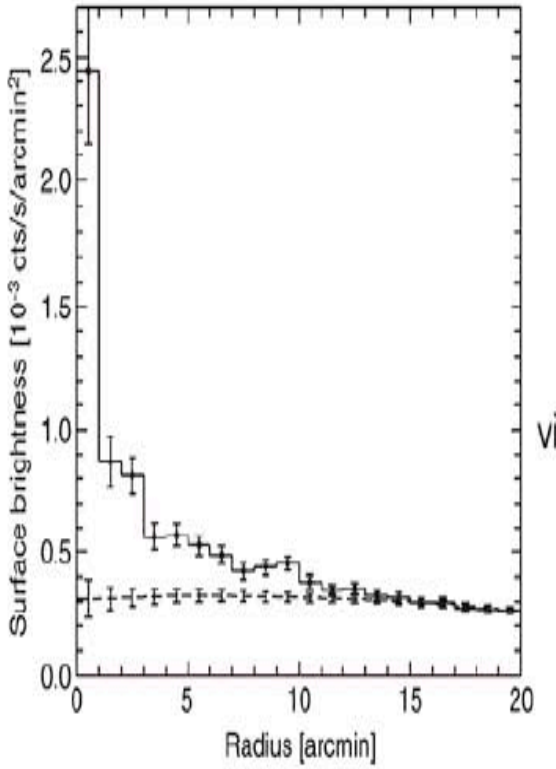
Subtract point sources



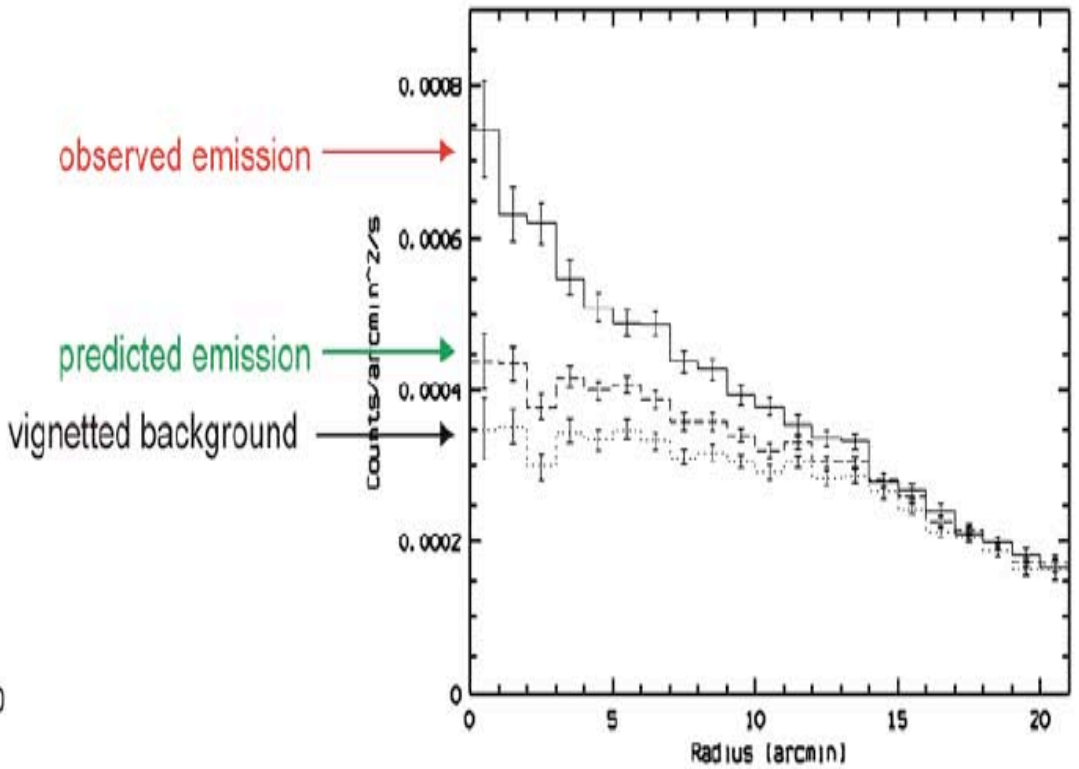
- ~5% of clusters show diffuse radio emission
- Most of these show high Lx and signs of a recent merger
- Indicates the presence of
  - Relativistic electrons
  - Secondary particle production
  - Dark Matter annihilation products?

Evidence for non-thermal emission-
Excess EUV emission

- clear evidence for the Virgo and Coma clusters
- Possible detections for A1795, A2199, A4095

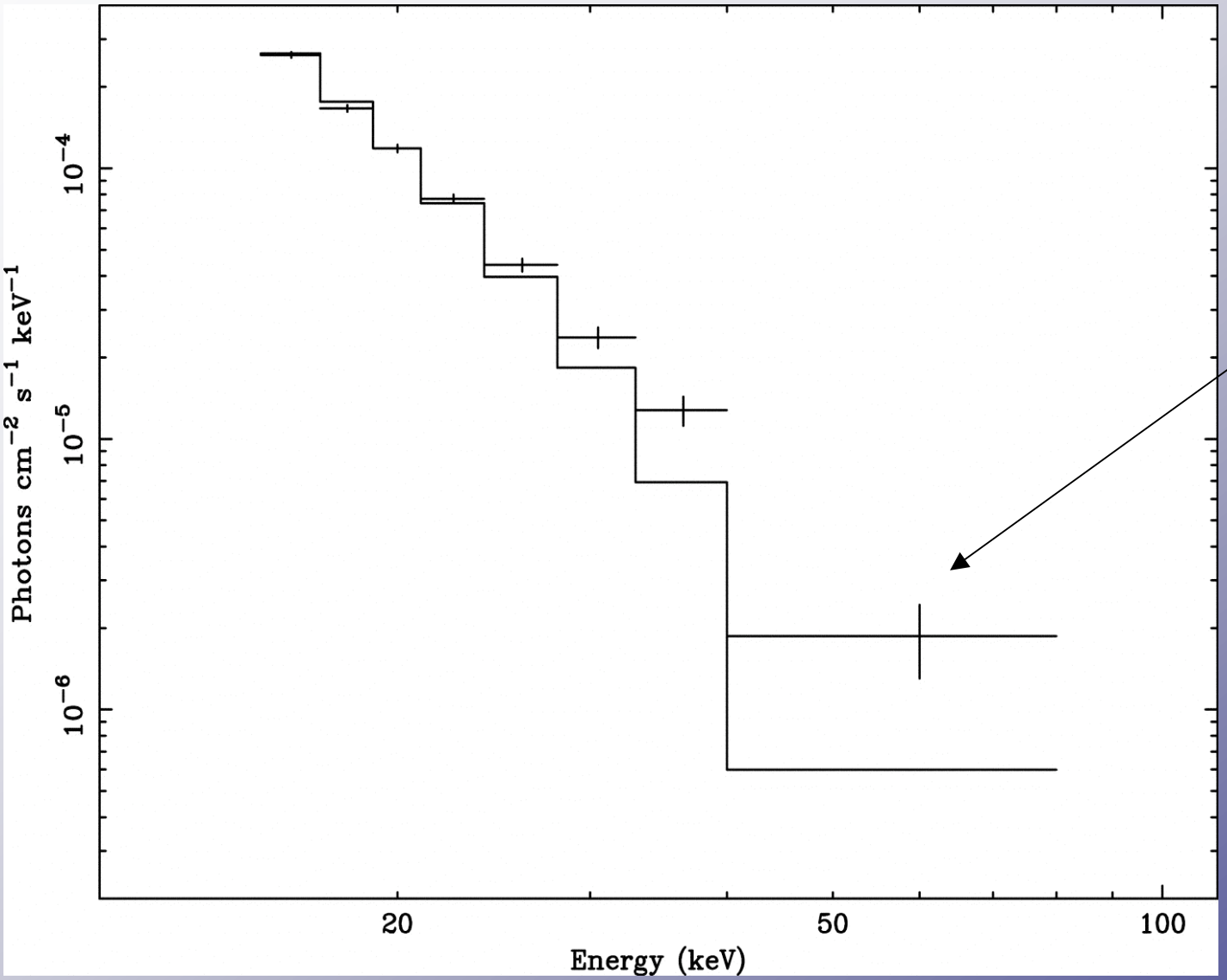


Virgo (Berghöfer et al. 2000)



Coma (Bowyer et al. 1999)

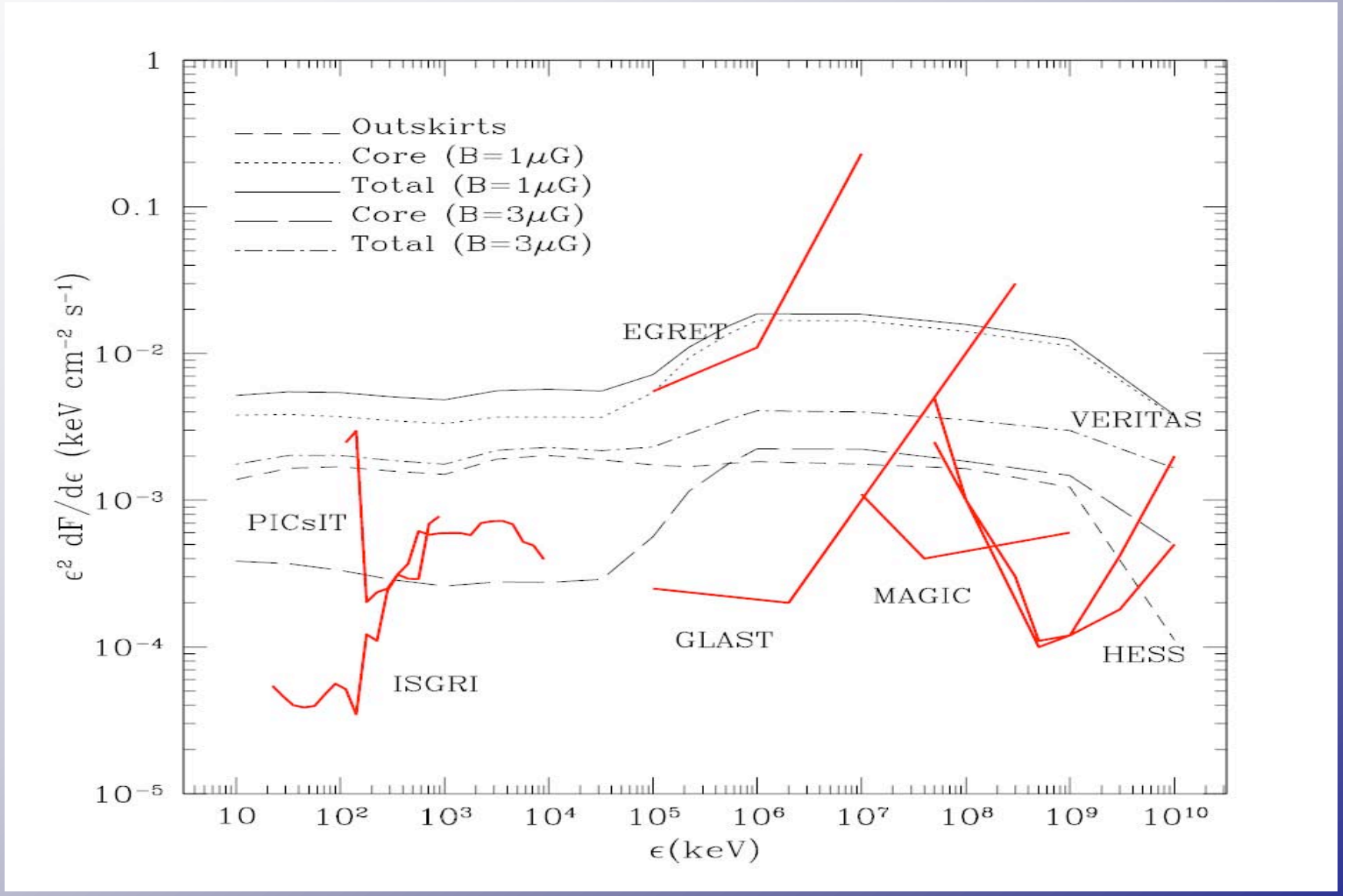
Evidence for non-thermal emission-
Non-thermal X-ray emission



Excess emiss
from the Cor
Cluster

Fusco-Femiano et al. 2007

These data allow us to construct models of the cluster γ-ray emission



Conclusions

- Galaxy Clusters are an exciting new class of objects that will likely be detected with GLAST
- γ-rays will allow us to probe
  - The energetic particles
  - Acceleration mechanisms
    - Accretion shocks
    - AGN
  - Dark Matter (?)