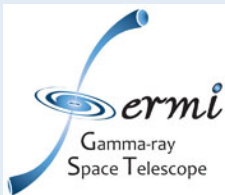


A direct observation of positrons with an astrophysics instrument

Michael S. Briggs
(UAHuntsville)
and the GBM Team



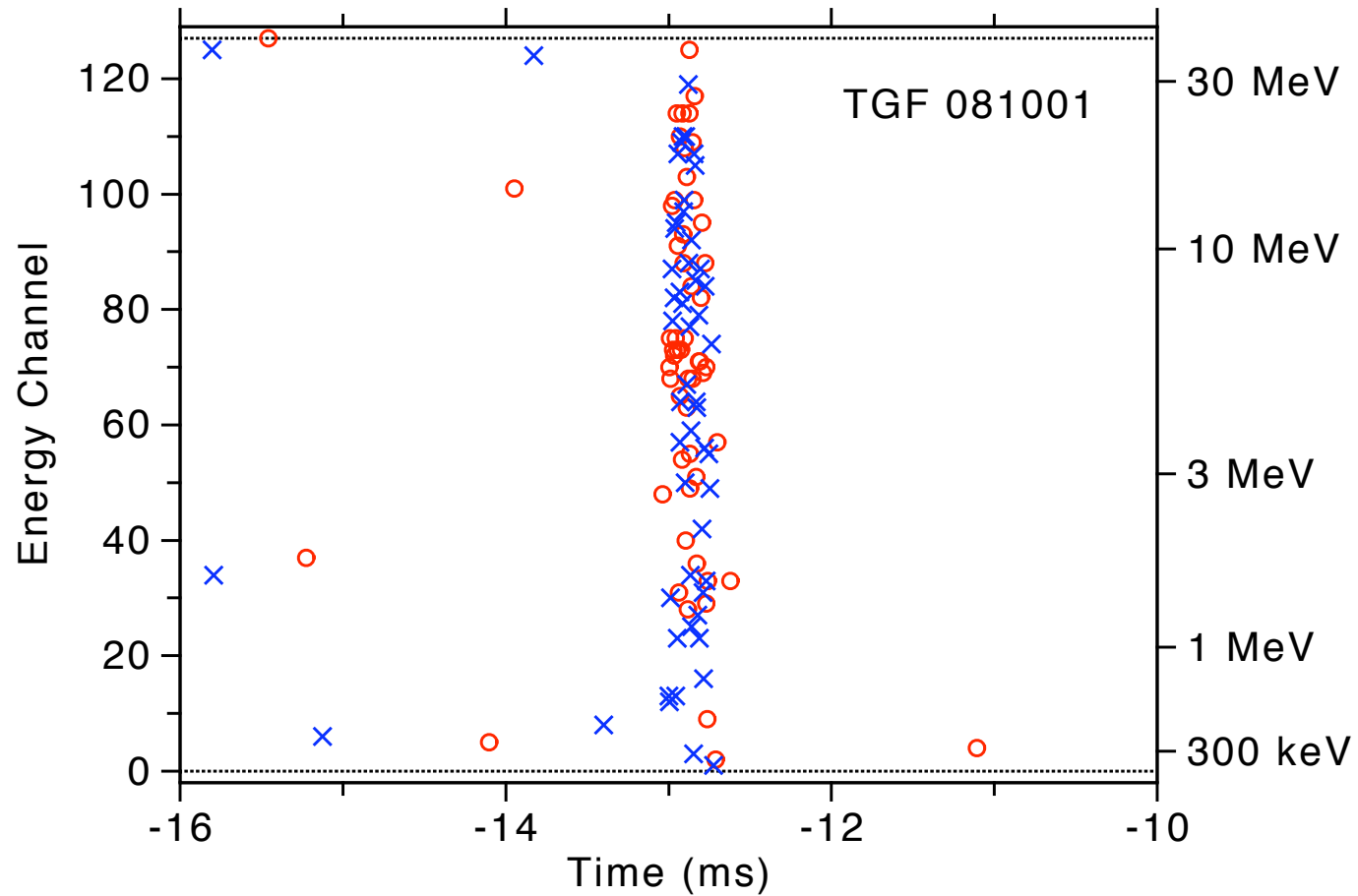
Fermi Gamma-ray Burst Monitor (GBM)

UAH



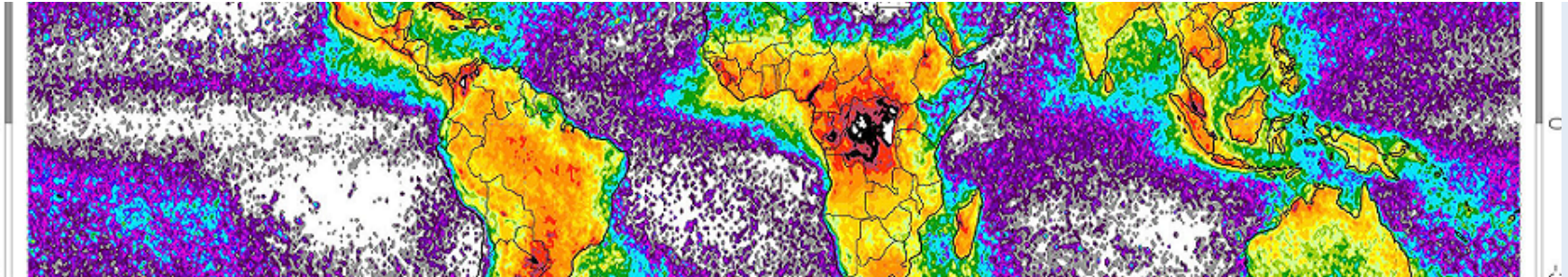
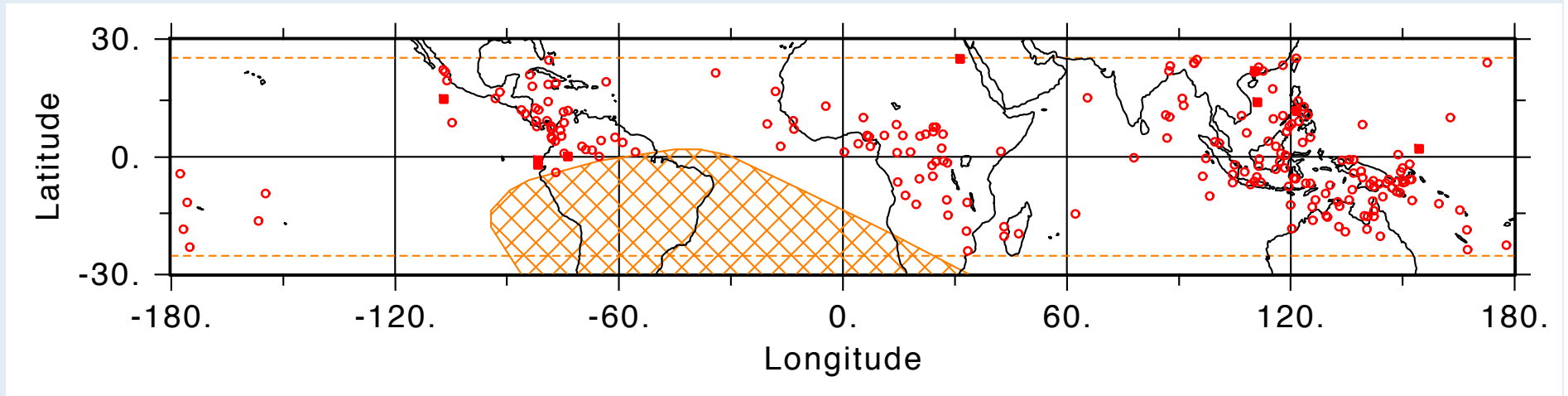
Positrons in Astrophysics
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Typical Terrestrial Gamma-ray Flash



Terrestrial Gamma-Ray Flashes

216 GBM TGFs

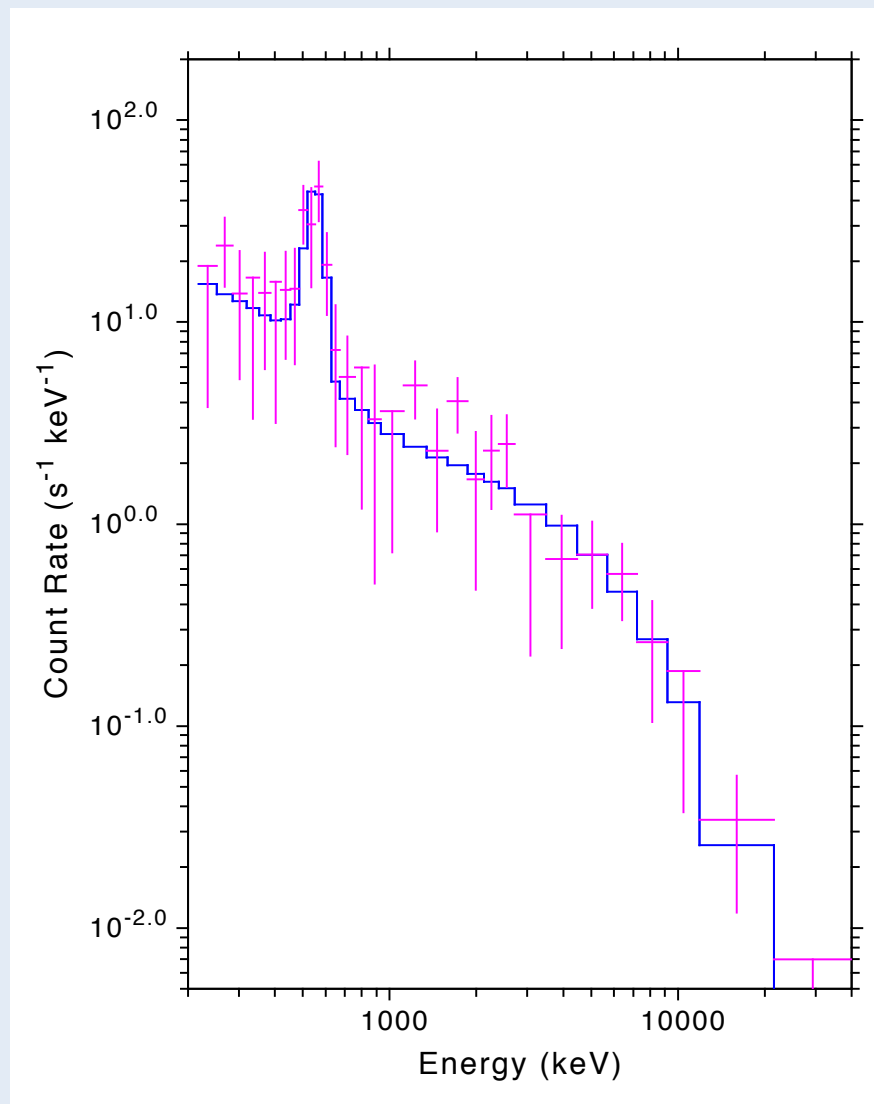


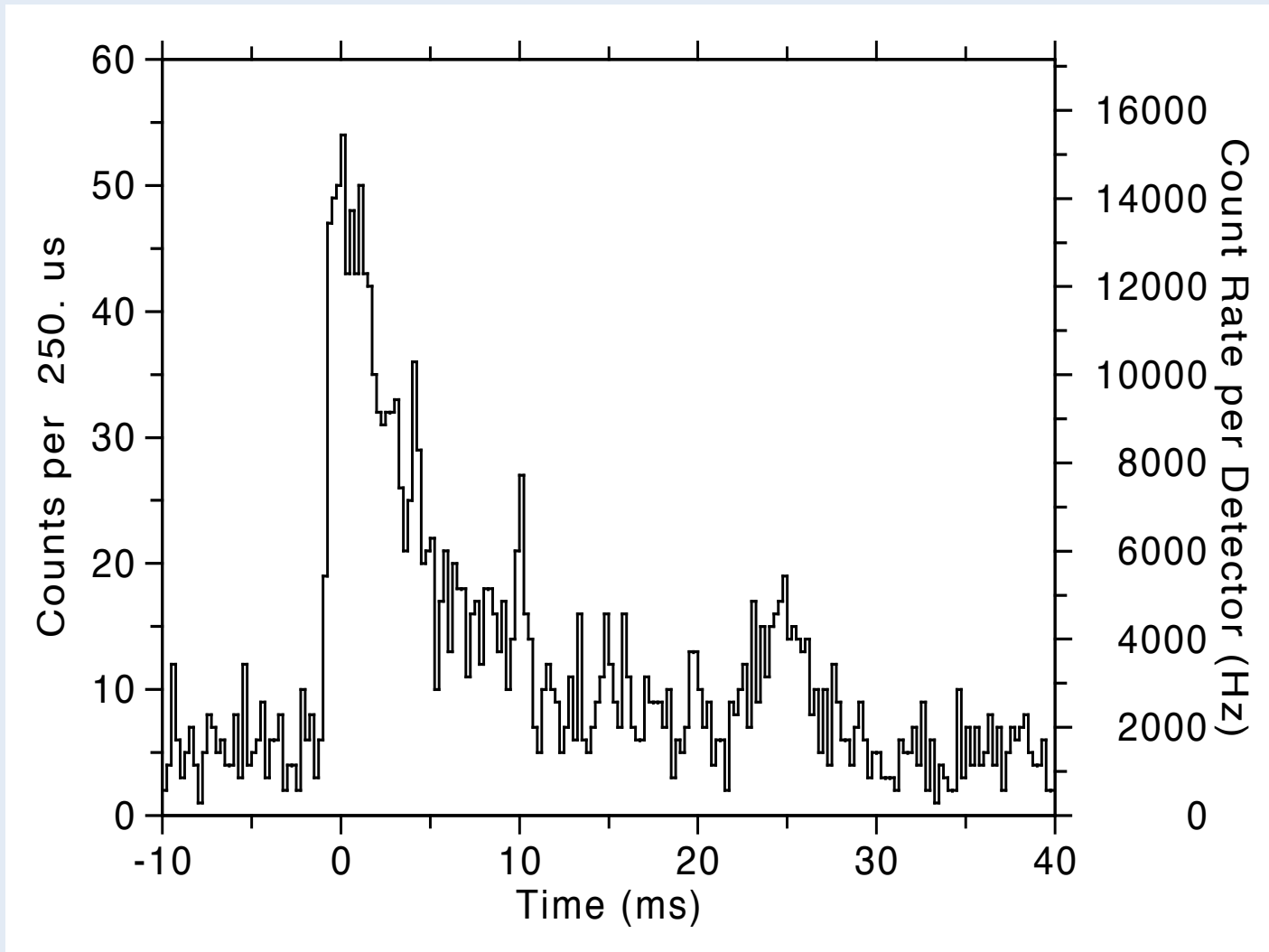
Lightning Imaging Sensor (LIS)

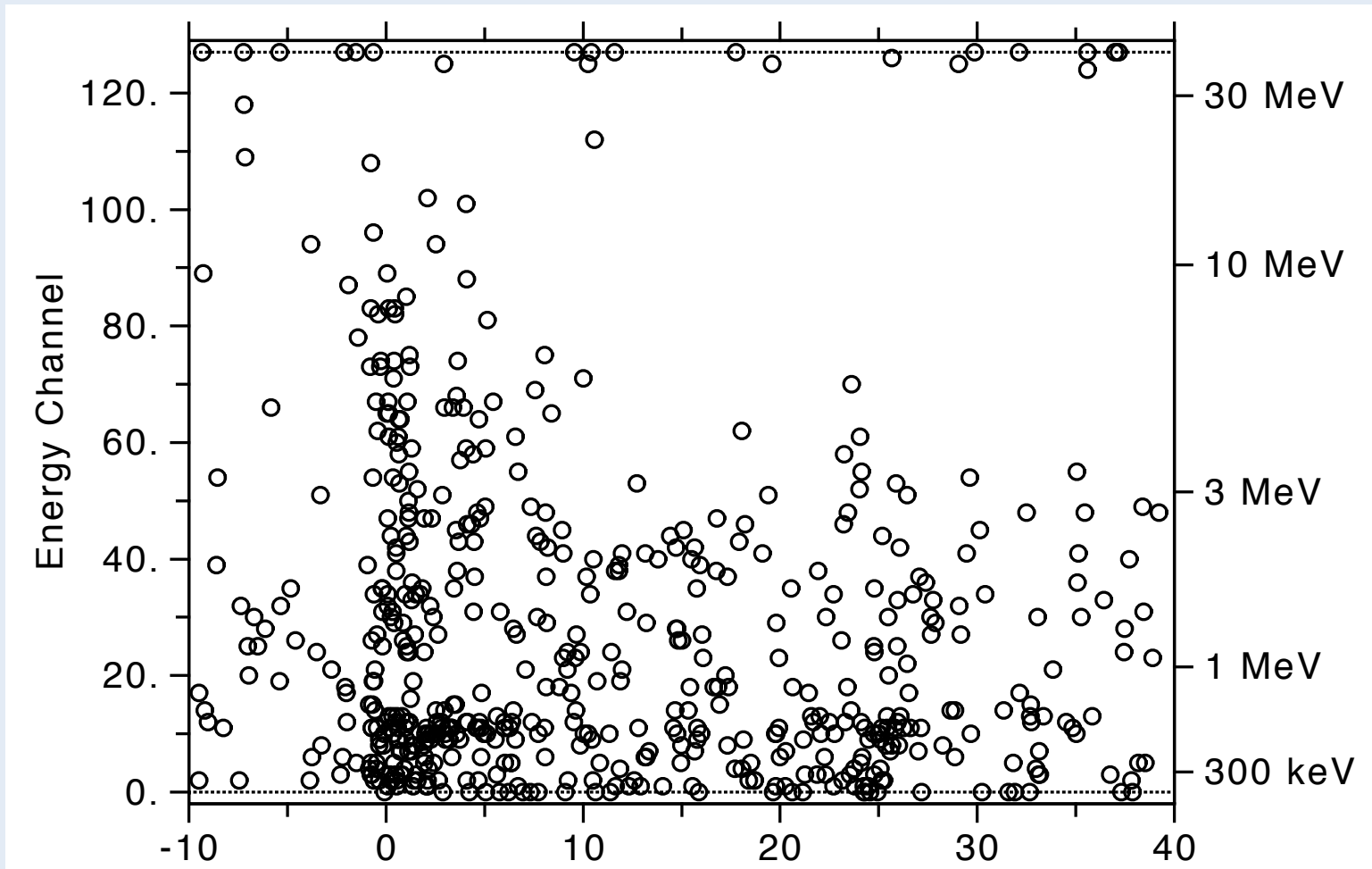


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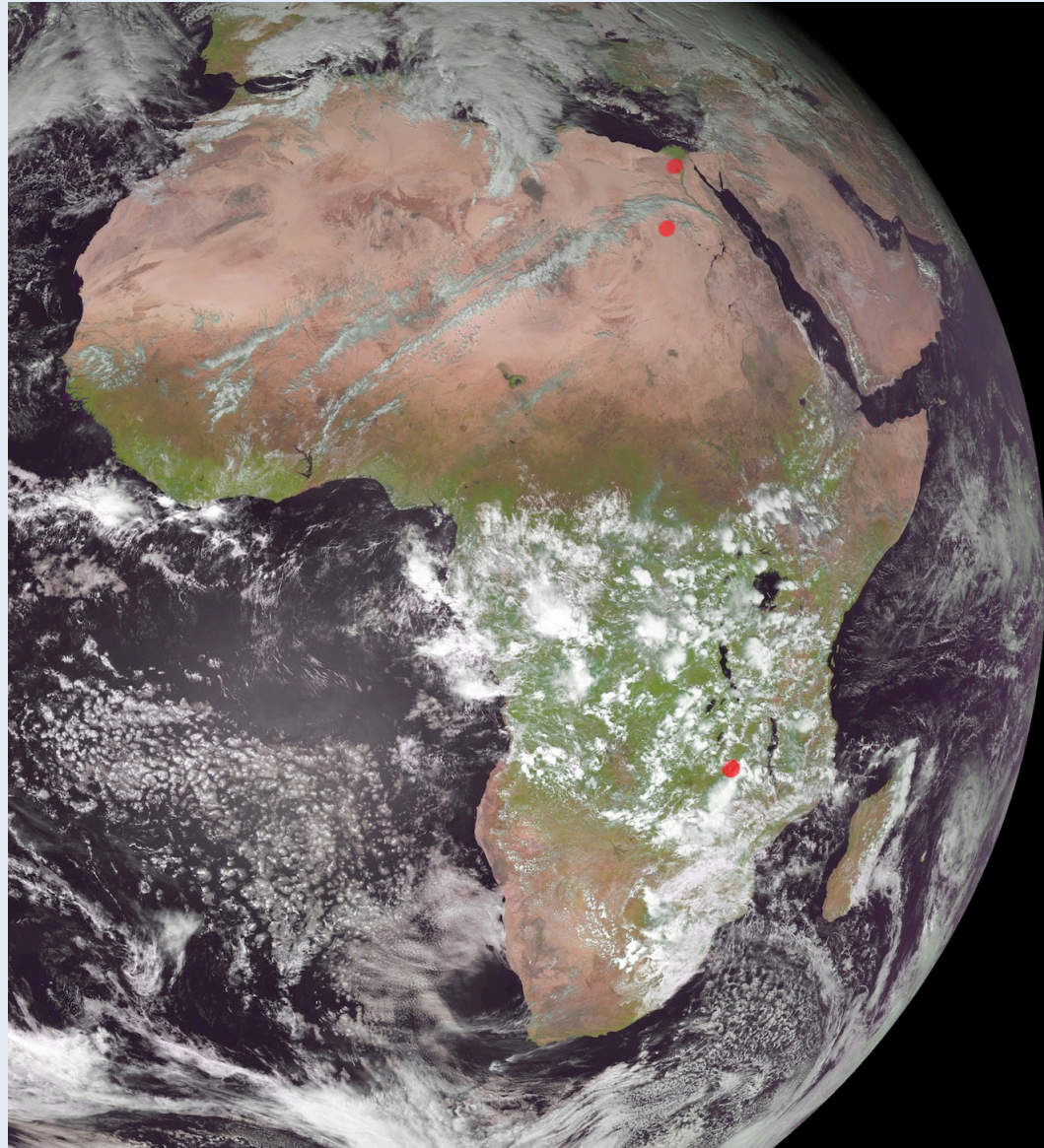
Subclass – example: 091214



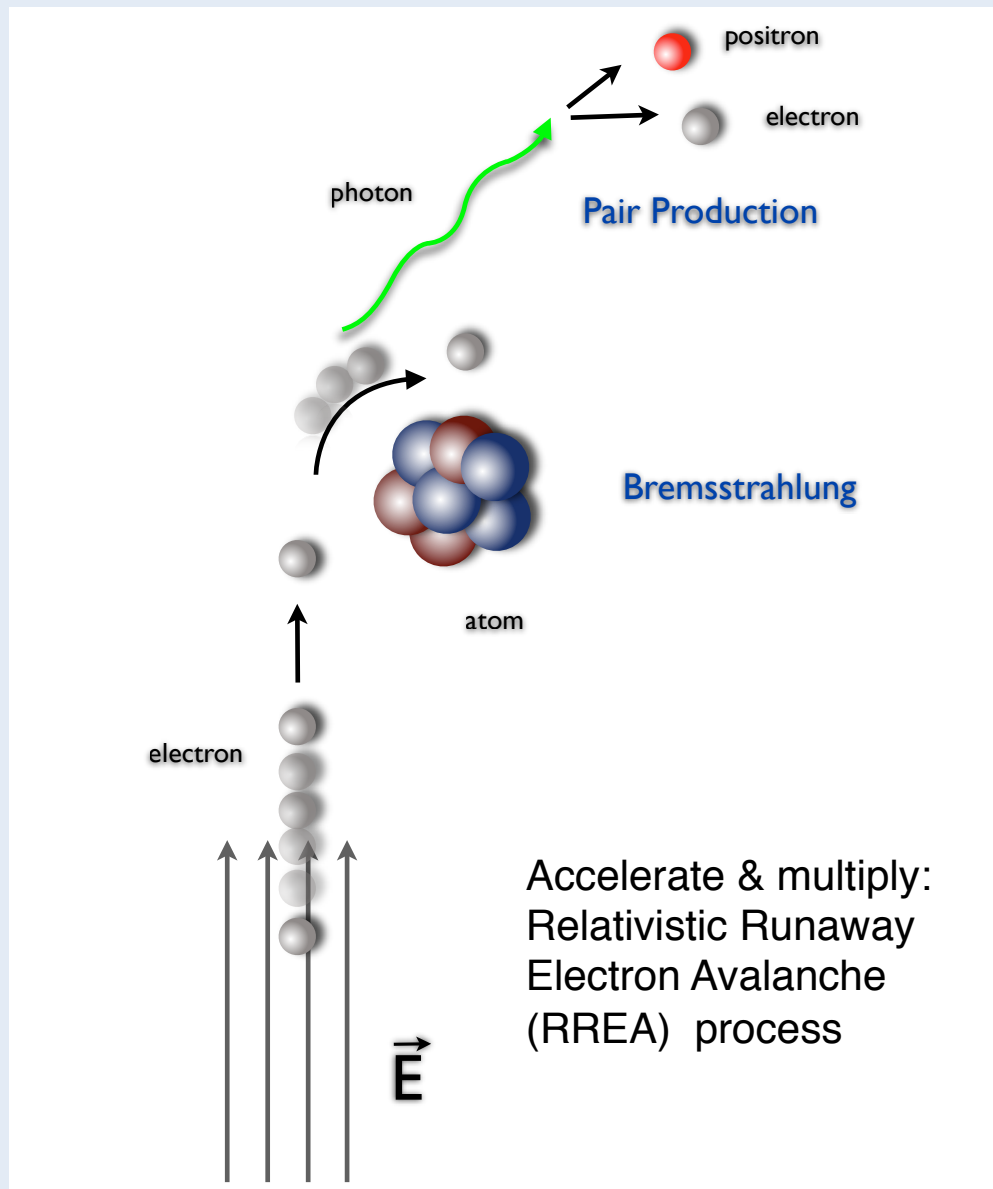


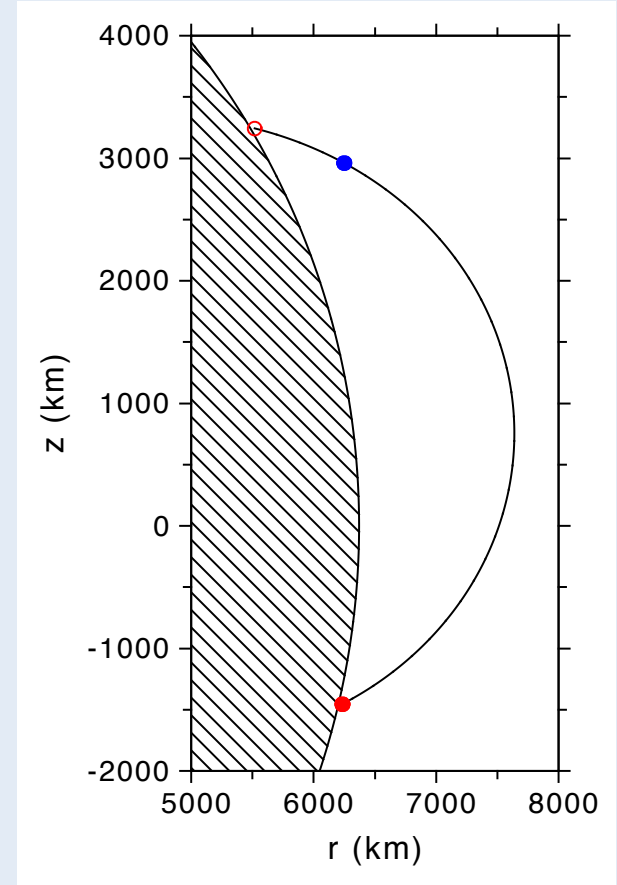
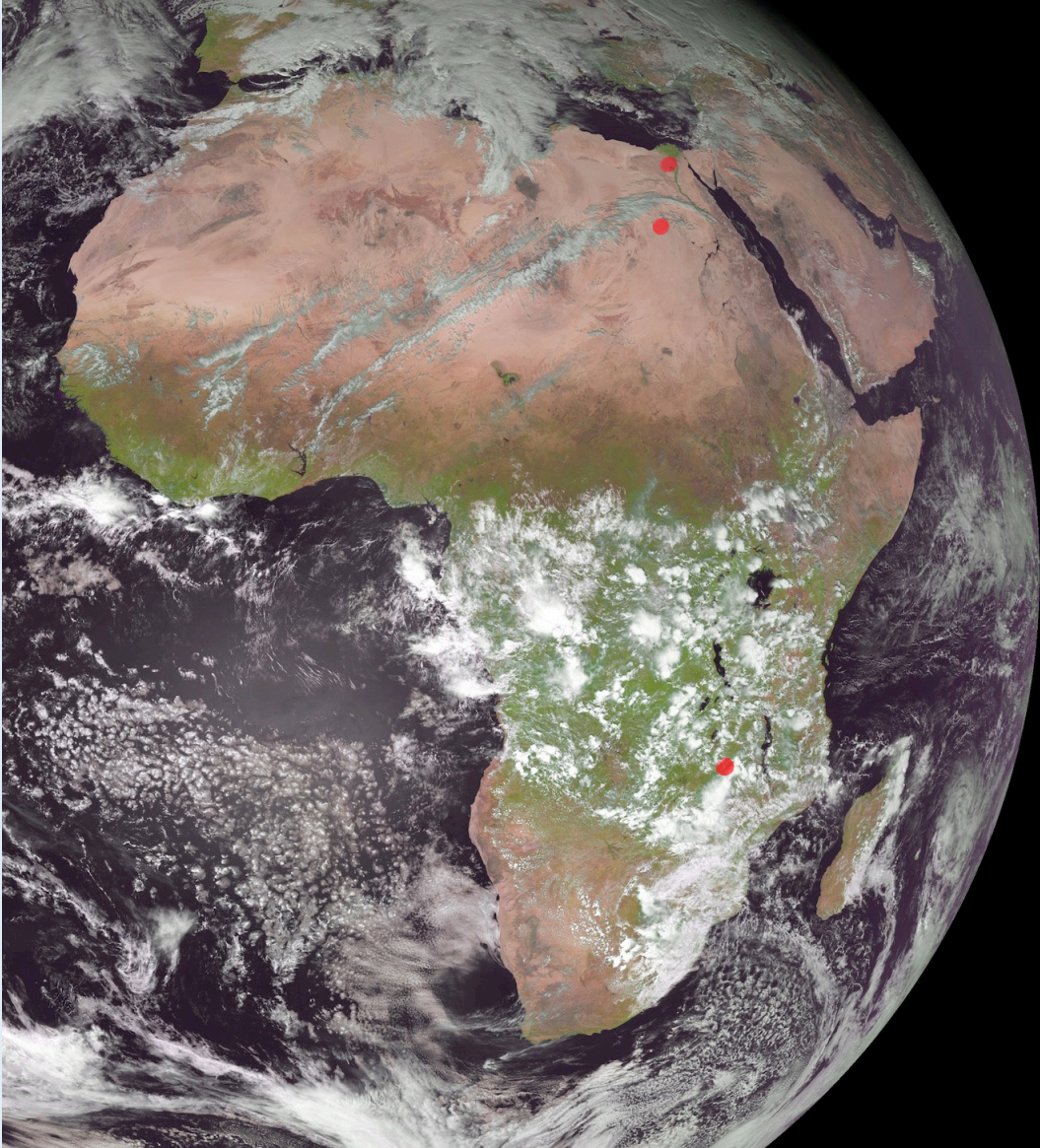


Meteosat 9 image

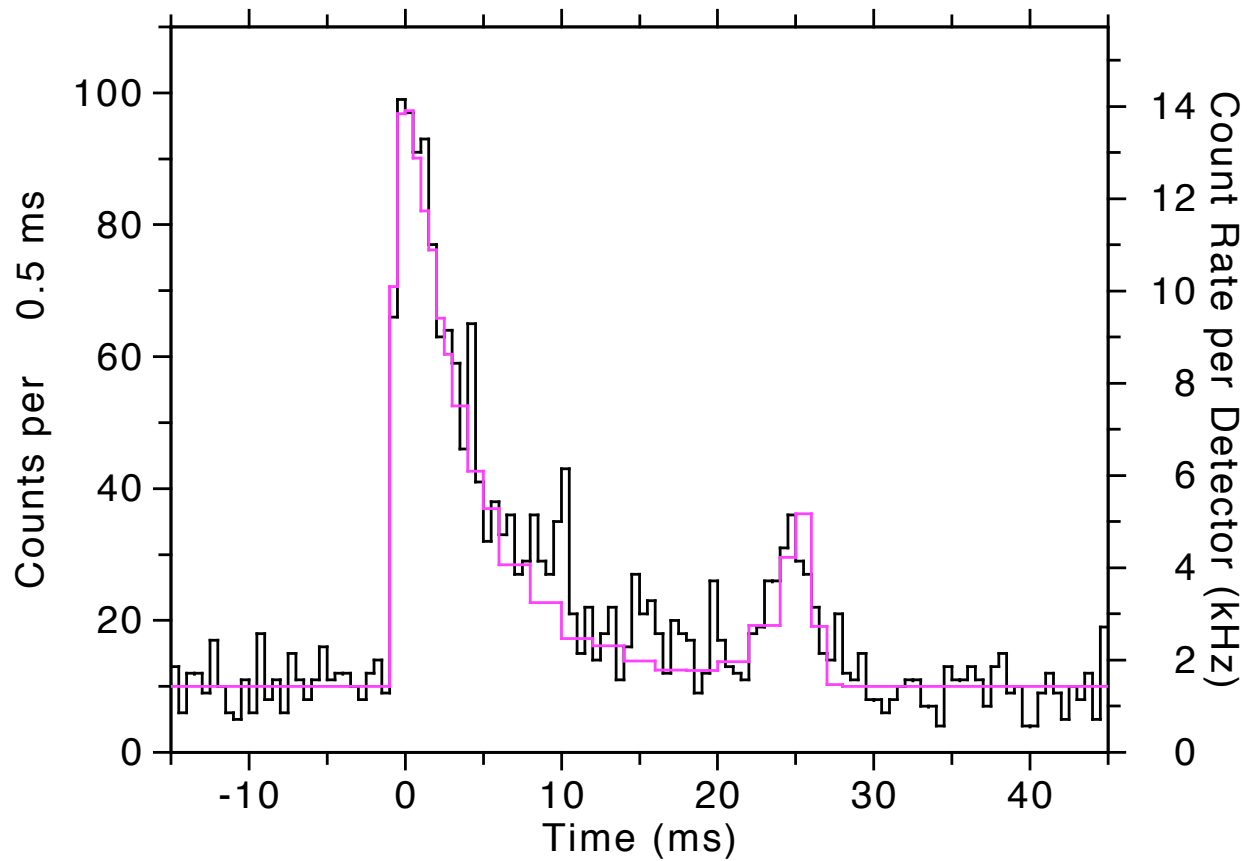


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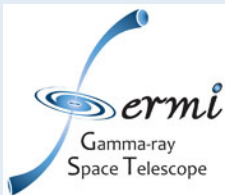


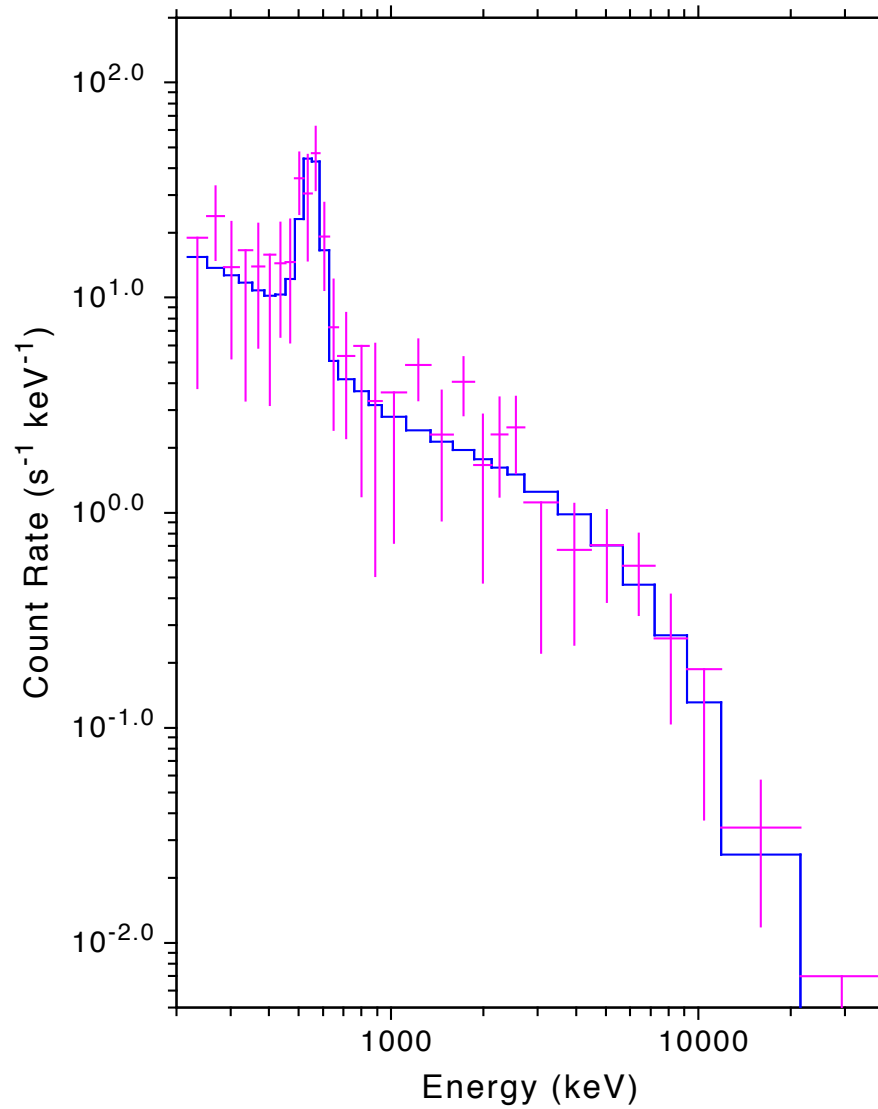
Meteosat 9 image



Magenta: simulation by J. Dwyer

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Summary

- Most TGFs are observed in gamma-rays,
- The rare “electron” TGFs are magnetically directed beams of electrons and positrons,
- Relativistic processes are taking place in or above thunderstorms:
 - ✧ acceleration of electrons to relativistic energies,
 - ✧ bremsstrahlung gamma-rays to ≈ 40 MeV (GBM) or 100 MeV (AGILE),
 - ✧ secondary electrons (Compton scattering) and
 - ✧ secondary pairs (pair production).
- More: http://gammaray.nsstc.nasa.gov/publications/tgf_journal.html

