

WEEKLY CALENDAR

September 7, 2009

Departmental Colloquium

"Terrestrial Gamma-ray Flashes (TGF's) Above Thunderstorms"

3:40 PM, September 10, 2009
109 Nicholson Hall

Gerald J. (Jerry) Fishman
NASA-Marshall Space Flight Center

Host: Michael Cherry

• *Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall* •

Intense millisecond flashes of MeV photons have been observed with space-borne detectors. These terrestrial gamma-ray flashes (TGFs) were discovered with the Burst and Transient Source Experiment (BATSE) aboard the Compton Gamma-Ray Observatory (CGRO) in the early 1990s. They are now being observed with the RHESSI spacecraft, with the AGILE Experiment, and with the Gamma-ray Burst Monitor (GBM) detectors on the Fermi Gamma-ray Space Telescope.

The TGFs have extremely hard spectra, with photons extending to over 30 MeV. The RHESSI spacecraft, which does not require a trigger for observations, detects about one TGF per day, but the Fermi-GBM detectors, which require a trigger, see only about one every four weeks. The intrinsic intensity vs. frequency distribution of TGFs is unknown.

The most likely origin of these high-energy photons is bremsstrahlung radiation from electrons, produced by relativistic runaway electrons in an intense quasi-static electric field in or above thunderstorm regions; the altitude of origin is quite uncertain. These TGFs may produce an appreciable radiation dose to passengers and crew in nearby aircraft. The observational aspects of TGFs will be the main focus of this talk; theoretical aspects remain speculative.

ANNOUNCEMENT:

The University will be closed on Monday, September 7, 2009 due to the Labor Day holiday.

Publications:

- "Projection x-ray imaging with photon energy weighting: experimental evaluation with a prototype detector", **P.M. Shikhaliev**, *Physics in Medicine and Biology*, v.54 (2009), pp. 4971-4992.