

Type of Object	Number
Blazar galaxy	1069
Pulsars	115
Supernovae	77
Active Galaxies	20
Normal galaxies and stars	20
Unknown objects	572

Gamma Ray Source Types

Blazar galaxy - A distant galaxy with a very active nucleus containing high speed ionized gas being ejected from a dense core region, possibly containing a massive black hole.

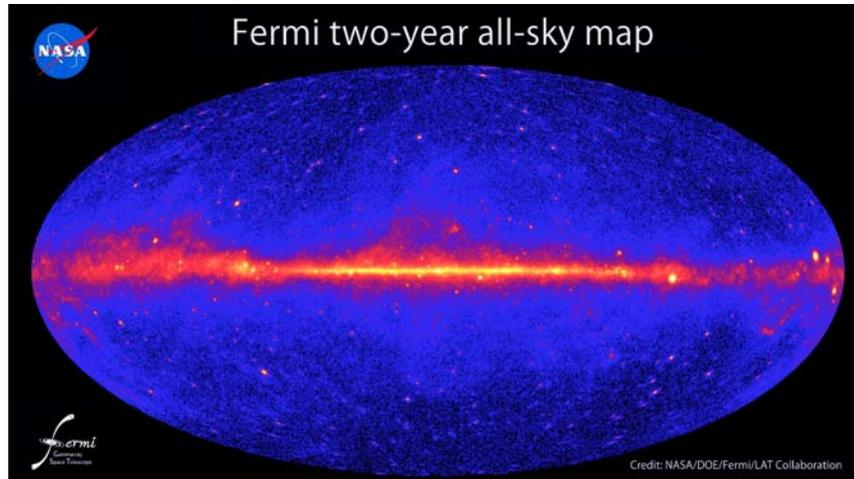
Pulsars- Dense remnant of the core of a star after a supernova explosion. Typically spinning rapidly and very hot, leading to gamma ray emission.

Supernovae- The violent death of a massive star, usually leading to the formation of a neutron star (pulsar) or a black hole. Powerful source of x-rays and gamma rays during explosion.

Active galaxies – Galaxies that either have a massive black hole or intense burst of star formation, leading to heating of gases and emission of x-rays and gamma rays.

Normal galaxies – Galaxies with moderate star formation, or low levels of ionized gas, and only occasional supernova events.

Normal stars – Stars can be hot enough to emit bursts of x-rays and gamma rays during solar storm events.



This all-sky image, constructed from two years of observations by NASA's Fermi Gamma-ray Space Telescope, shows how the sky appears at light energies greater than 1 billion electron volts (1 GeV).

As a comparison, the x-rays used by your dentist to search for cavities have energies of only about 5,000 electron volts (5 KeV).

In the false-color diagram above, brighter colors like red orange and yellow, indicate brighter gamma-ray sources. A diffuse glow fills the sky and is brightest along the plane of our galaxy (middle).

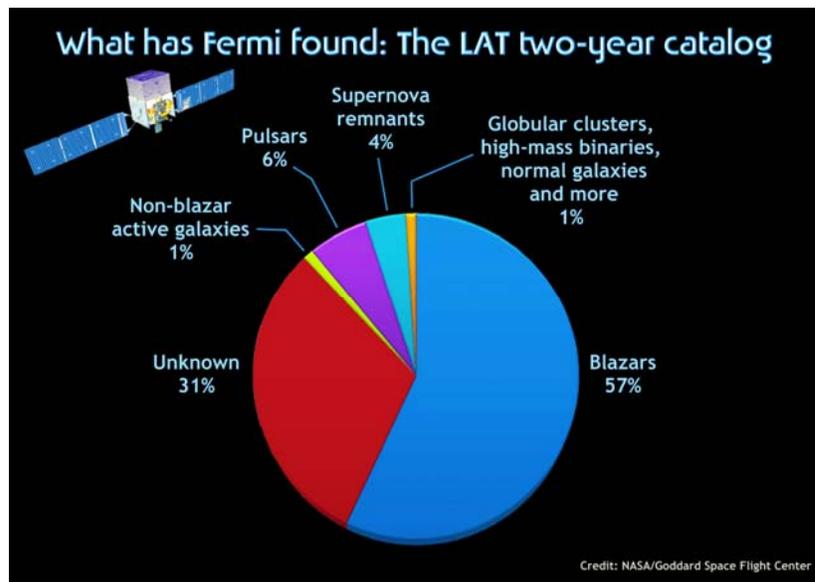
Earlier this year, the Fermi Science Team released its second catalog of sources detected by the satellite's Large Area Telescope (LAT), producing a list of 1,873 gamma-ray sources found in their survey. The resulting classifications of the sources are shown in the table above.

Problem 1 – Create a pie graph showing the percentage of gamma-ray sources in each of the six different categories listed in the original Fermi/LAT survey.

Problem 2 – What percentage of sources were probably produced by pulsars and supernova?

Problem 1 –Answer: See the percentages listed in the table below and the actual pie graph provided by the Fermi/LAT research report.

Type of Object	Number	Percentage
Blazar galaxy	1069	57%
Pulsars	115	6%
Supernovae	77	4%
Active Galaxies	20	1%
Normal galaxies and stars	20	1%
Unknown objects	572	31%



This pie graph is from http://www.nasa.gov/mission_pages/GLAST/news/gamma-ray-census.html

Problem 2 – What percentage of sources were probably produced by pulsars and supernova?

Answer: $6\% + 4\% = 10\%$