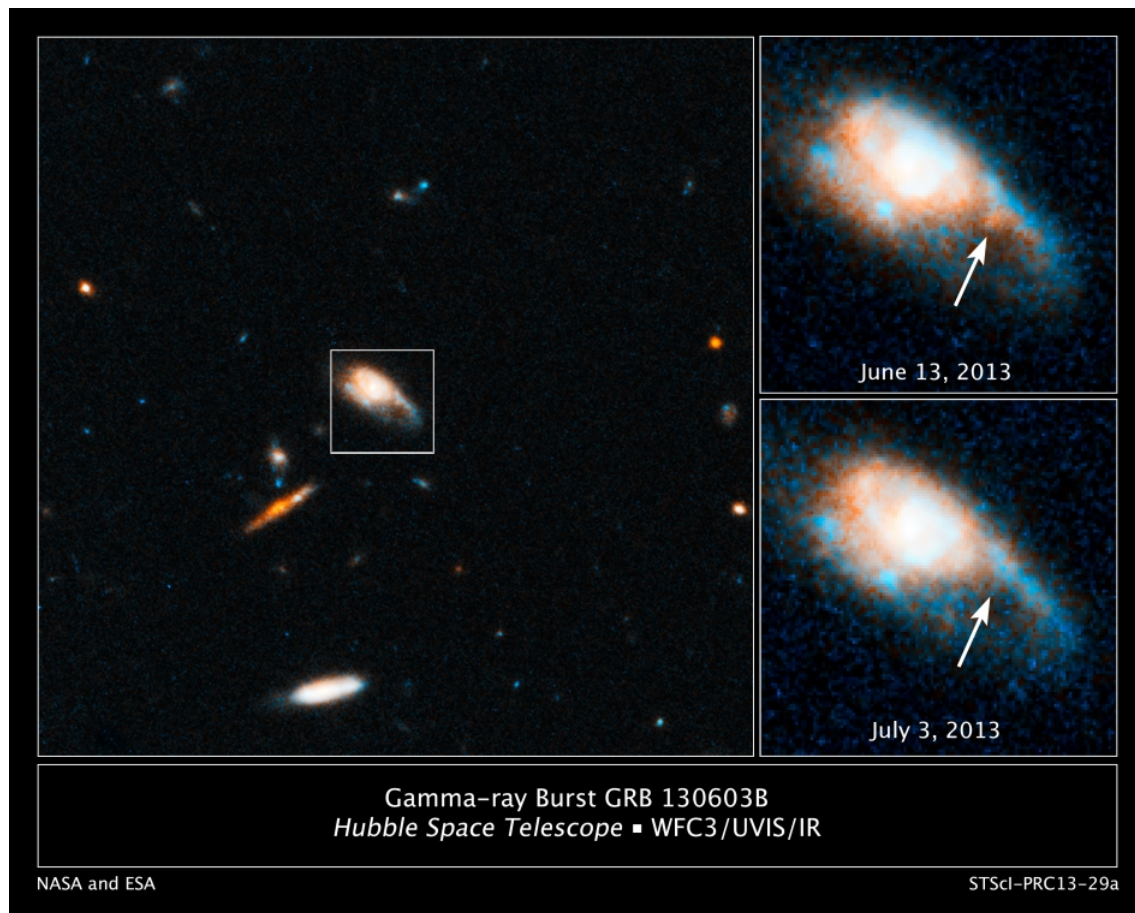


12.15: Gamma-Ray Bursts (GRBs)

During the 1960s, there was great concern among the Superpower Countries that nuclear testing or even a nuclear attack could occur without notice. The United States developed a series of satellites to monitor gamma radiation pulses emitted by nuclear weapons tested or used in space. Gamma radiation outbursts were observed and determined to be coming from space. Further research showed these outbursts were fairly evenly distributed throughout the sky. **Gamma-ray bursts**, or **GRBs**, are flashes of gamma radiation related to extreme energetic explosions detected in very distant galaxies. GRBs are the brightest electromagnetic events known to occur in the Universe. These GRBs can range from ten milliseconds to several minutes. The initial GRB is usually followed by a longer lived afterglow, emitted at wavelengths such as X-ray, UV, visual, microwave, and radio wavelengths.

A number of satellites have been built to observe GRBs. The Compton Gamma Ray Observatory determined that GRBs were from outside our Galaxy. (There is a class of gamma-ray objects within our galaxy, but not with the extreme power of GRBs). Some have speculated that GRBs are possibly at the edge of the early Universe and the death throes of extremely massive stars, which only lasted about 1 million years. These stars appear to eject Gamma Rays after a **hypernova event**, an extreme supernova which produces gamma radiation. GRBs also appear to come from within stellar nurseries.



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Consider this...

"The nitrogen in our DNA, the calcium in our teeth, the iron in our blood, the carbon in our apple pies were made in the interiors of collapsing stars. We are made of starstuff. "

—Dr. Carl Sagan *Cosmos* (2002)

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