

**Field:**

*Physics/Astrophysics*

**Session Topic:**

*Gamma-ray Bursts*

**Speaker:**

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This contribution will emphasize the role played by Gamma-Ray bursts (GRBs) in our comprehension of the evolution of the Universe and of galaxies in particular. It has to be realized that no other stellar-scale objects such as GRBs can be seen at those gigantic distances that probe the Universe childhood, this period we call the high-redshift Universe. Because GRBs are extremely energetic events, they unveil regions of active star formation in the early times and, in some cases, pinpoint the host galaxy that would otherwise be undetected in other surveys. We will concentrate in this contribution on the so-called long bursts that result from the collapse and death of massive stars and only briefly mention the short bursts thought to result from the merger of two neutron stars; the former ones being indeed of greater interest in cosmology. It is remarkable to note the large variety of astrophysical aspects in which GRBs are involved to help us understand them. Stellar evolution and the formation of compact objects on the stellar scales but also the interstellar medium, dust formation and chemical evolution on the galactic scales, as well as high-redshift galaxies and the reionization epoch. This is those galactic aspects that we will focus on. The challenges for cosmology today are to improve our understanding of the progenitor stars leading to GRBs, to collect data on their host galaxies, and to fit in those information in our overall view of the Universe.

Two web sites may be of interest: A "Gamma-ray Bursts FAQ" written by Edo Berger who is an expert in the broad-band investigation of GRB host galaxies:

<http://www.astro.caltech.edu/~ejb/faq.html>

and an explanatory page from the Swift Mission web site, a particularly crucial instrument for today GRBs science: [http://swift.sonoma.edu/about\\_swift/grbs.html](http://swift.sonoma.edu/about_swift/grbs.html).