Transient astronomical event

A **transient astronomical event**, often shortened by astronomers to a **transient**, is an astronomical object or phenomenon whose duration may be from seconds to days, weeks, or even several years. This is in contrast to the timescale of the millions or billions of years during which the galaxies and their component stars in our universe have evolved. Singularly, the term is used for violent deep-sky events, such as supernovae, novae, dwarf nova outbursts, gamma-ray bursts, and tidal disruption events, as well as gravitational microlensing,[1] transits and eclipses. These events are part of the broader topic of time domain astronomy.

Contents

History

Before the invention of telescopes, events such as these that were visible to the naked eye, from within or near the Milky Way Galaxy, were very rare, and sometimes hundreds of years apart. However, such events were recorded in antiquity, such as the supernova in 1054 observed by Chinese, Japanese and Arab astronomers, and the event in 1572 known as "Tycho's Supernova" after Tycho Brahe, who studied it until it faded after two years.[2] Even though telescopes made it possible to see more distant events, their small fields of view – typically less than 1 square degree – meant that the chances of looking in the right place at the right time were low. Schmidt cameras and other astrographs with wide field were invented in the 20th century, but mostly used to survey the unchanging heavens.

The interest in transients has intensified[2] because studying them helps astrophysicists to understand the mechanisms which produced our universe. As telescopes with larger fields of view come into use, such as the Palomar Transient Factory, the spacecraft Gaia and the LSST, they spot many more such occurrences. The ability of modern instruments to observe in wavelengths invisible to the human eye (radio waves, infrared, ultraviolet, X-ray) increases the amount of information that may be obtained when a transient is studied. The proposed ULTRASAT satellite will observe a field of more than 200 square degrees continuously in the ultraviolet range. This wavelength is particularly important for detecting supernovae within minutes of their occurrence.

See also

- Celestial event
- List of gamma-ray bursts
- List of gravitational wave observations
- Soft X-ray transient
- X-ray burster
- X-ray pulsar
- X-ray transient

References

1. Schmidt, Brian (20 April 2012). "Optical Transient Surveys". *Proceedings of the International Astronomical Union*. **7** (S285): 9–10. Bibcode:2012IAUS..285....9S (http://adsabs.harvard.edu/abs/2012IAUS..285....9S). doi:10.1017/S1743921312000129 (https://doi.org/10.1017%2FS1743921312000129).
2. Lecture by Prof. Carolin Crawford, 2014, “The Transient Universe” (http://www.Gresham.ac.uk/lectures-and-events/the-transient-universe)

Further reading

- Vedrenne, G. & Atteia, J.-L. (2009). *Gamma-Ray Bursts: The brightest explosions in the Universe* (https://books.google.com/books?id=jZHSdrvzz0gC). Springer. ISBN 978-3-540-39085-5.
- Gezari, S.; Martin, D. C.; Forster, K.; Neill, J. D.; Huber, M.; Heckman, T.; Bianchi, L.; Morrissey, P.; Neff, S. G.; Seibert, M.; Schiminovich, D.; Wyder, T. K.; Burgett, W. S.; Chambers, K. C.; Kaiser, N.; Magnier, E. A.; Price, P. A.; Tonry, J. L. (2013). "Thegalextime Domain Survey. I. Selection and Classification of over a Thousand Ultraviolet Variable Sources". *The Astrophysical Journal*. **766** (1): 60. arXiv:1302.1581 (https://arxiv.org/abs/1302.1581). Bibcode:2013ApJ...766...60G (http://adsabs.harvard.edu/abs/2013ApJ...766...60G). doi:10.1088/0004-637X/766/1/60 (https://doi.org/10.1088%2F0004-637X%2F766%2F1%2F60).

External links

- SIMBAD Astronomical Database (http://simbad.u-strasbg.fr/simbad/)
- Sidoli, L. (2008). "Transient outburst mechanisms in Supergiant Fast X-ray Transients". arXiv:0809.3157 (https://arxiv.org/abs/0809.3157) [astro-ph (https://arxiv.org/archive/astro-ph)].