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# Preface: Transient sources from radio to gamma rays

In this issue we bring together reviews by leading astronomers on the rapidly growing field of transient astronomical sources, from radio to gamma rays. Although the term 'transient' has traditionally often been used for highly energetic and explosive phenomena such as supernovae and gamma ray bursts, the rapid growth in some areas and exciting plans of studying unexplored areas in the realm of time-domain astronomy is encompassing a growing range of transient objects. These include solar system objects, exo-planets, accreting white dwarfs, neutron stars and stellar mass black holes, active stellar binary systems, pulsars, rotating radio transients, high-amplitude variable stars, several types of supernovae and active galactic nuclei.

The Compact Oxford English Dictionary gives the meaning of 'transient' as "Passing by or away with time; not durable or permanent; temporary, transitory; *esp.* passing away quickly or soon, brief, momentary, fleeting". It is natural to enquire, how short is 'fleeting'? While in this context one may not take the position that "In the presence of eternity, the mountains are as transient as the clouds" (attributed to R. Ingersoll, but essence is from the Quran, Surah: 27, Aya 88), the rapidly growing field of transients has encompassed events with time scales ranging from millisec or less, as in pulsars and RRATs, to days and months as in novae, supernovae and binary systems.

Along with the time scale, a related issue is to distinguish a 'transient' from a 'variable source'. Although, the difference between, say, a highly variable source and a transient may not always be clear cut, and would also depend on the sensitivity of the observations, various rules of thumb have been suggested. For example, at X-ray wavelengths, transients have sometimes been distinguished by a rapid rise in intensity in about a week followed by a gradual decline over a month or two, with the change in intensity being often greater than ~1000, and also with timescales being set between the recurrence of events relative to the quiescent state. At radio wavelengths where identifications of transients from archival continuum observations has been a relatively recent field of study, transients have sometimes been identified from non-detection in another epoch while variable sources are detected at the different epochs. From the results of existing, ongoing and planned surveys at a variety of wavelengths, one should be able to fine tune the distinguishing features of transient events from the duration and change in intensity during the outburst compared with its quiescent phase and the recurrence time scales when applicable. Follow-up multiwavelength observations are likely to play an important role in understanding the physics of these events and objects. Studies at high energies have yielded many interesting results, while at low energies we are perhaps on the threshold of many exciting discoveries. We hope that this issue gives the readers a glimpse into studies of transient sources at different wavelengths.

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