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## Emission line space solar coronagraph

Over the past several decades, knowledge about the solar corona has progressed immensely since its discovery during a total solar eclipse centuries ago. With the development of new techniques/technologies, especially with the space instruments, the solar corona can be observed without the need for a total solar eclipse for long durations. The past space instruments (for e.g. SMM, YOHKOH, SOHO, TRACE, Ulyses and others) provided wealth of information on the coronal dynamics, especially the sudden energy releases during flares and coronal mass ejections (CMEs). With these phenomenal observations, it has become clear that the solar corona is the prime driver for the inner solar system space environment and to an extent climate on the Earth and other planets. However, we are in an early phase of understanding our space neighbourhood in terms of its energetic particle and plasma contents, now known as a new area called space weather. The magnetic variation of the Sun coupled with atmosphere and magnetosphere of the Earth is an area which is least understood.

The mission, *Aditya-1* is aiming to provide coronal dynamics data with sharp and fast images (high spatial and temporal resolution data) which will enhance our current knowledge about the solar corona and in turn the source of the space weather. It is expected to provide important information for the following areas: (i) The high temperature of the corona (a factor of 1000 more than that in the photosphere); (ii) the possible sources of CMEs which is critical for the future predictions, and (iii) small-scale dynamics of coronal loops which plays a role in the overall dynamics of active regions.

The data obtained with *Aditya-1* mission will be complementary to other future space-borne satellites. This mission will also provide technological improvements within the country, like (i) technology know-how of polishing mirrors to high-surface finish, (ii) development of fast CCD detectors and its electronics, and (iii) development of an imaging system with very low scatter light. See **page 167**.

## A comparative survey of algorithms for frequent subgraph discovery

Graph-based data mining has emerged as one of the most popular research areas in computer science. Many complex problems have been addressed by transforming their data into a graph representation and then finding a solution through the approach of subgraph discovery. This approach can be further divided into frequent subgraph discovery and dense subgraph discovery among other things. Frequent subgraph discovery is a well-addressed problem and a number of algorithms have been developed to solve it in the context of diverse applications including chemical carcinogenesis and social network analysis to name a few. There are many features that distinguish one algorithm from another and so the applicability of the algorithm for applications is not generic. The article by Varun *et al.* (**page 190**) is an effort to classify the algorithms for frequent subgraph discovery based on three criteria – the search strategy, nature of input, and completeness of the output, thus establishing a framework which can help developers to determine specific algorithms in terms of its various aspects such as graph representation, subgraph generation and frequency evaluation. The recent trends in frequent subgraph discovery that explain the divergence of the new methods from the established ones are also mentioned. An experimental evaluation of three prominent algorithms, FSG, gSpan, Gaston over three well-known benchmark datasets, is an important contribution that validates the relative superiority of the Gaston algorithm. In conclusion, the article sheds light on the future prospects of frequent subgraph discovery covering discovery of relevant but incomplete set of frequent subgraphs and also development of parallel algorithms that can exploit cluster or cloud computing.

## Microstructure and growth band studies of uroliths

The urolithiasis (commonly known as kidney stone disease) has got less attention regarding its deposition pattern. However, no study represents the various deposition patterns and origin of uroliths occurred in renal system. Further, it is interesting to know the nucleus of those uroliths from patients residing from semi-arid conditions. In the study by Kale *et al* (**page 225**), Randall's plaque has been recognized as one of the possible centre of uroliths. Previous studies recognized the fluoride content in uroliths, however, the present study observed that the fluoride is in the form of calcium fluoride ($CaF_2$) mixed with calcium oxalate ($CaC_2O_4$). The many interesting features are observed in various layers of urolith, are photographed with the help of optical and scanning electron microscopy. The study highlights the texture and features of kidney stones, shape and internal structure, location and the relationship between the crystals, and the organic compounds to infer plausible causes for their formation. The study concludes that uniform concentric rims of blood stain around the nucleus with multiple centres of growth bands, incremental growth bands of $CaF_2$ mixed with $CaC_2O_4$, and calcium phosphate in prominent growth direction forming papillae due to the probable availability of space leading into several papules. The individual growth bands can be ovoid, oblate, elongate, suggesting a driving force of a prominent growth direction and internal available space and development of radial cracks by the growing nucleus exerting pressure on the mineralized bands creating the development of radial cracks.