In this issue

Crystalline arrays of submicron-sized particles

Colloidal suspensions are ubiquitous and are being used in industrial products such as foods, inks, paints, coatings, cosmetics, etc. In many of these colloidal suspensions, the colloidal particles are highly polydisperse in size (i.e. size distribution is broad). The advances that have taken place in synthesizing highly monodisperse organic and inorganic particles in the submicron-size range, paved the way for self-assembling these into crystalline arrays with lattice constants in the visible range, which are popularly known as colloidal crystals. Light travelling through such crystals experiences a periodic variation of refractive index, analogous to periodic potential energy of an electron in the atomic crystal. This variation in refractive index in three dimensions with hundreds of nanometers periodicity is responsible for photonic band structure in these crystals. Thus these crystals are known as photonic crystals and have several high-tech applications such as Bragg diffraction devices, optical filters and switches, sensors, non-bleachable colour materials, etc. Large single crystalline domains are crucial for some of these applications. Further, monodisperse colloidal systems also exhibit structural ordering (e.g., gas-like, liquid-like and even glass like) analogous to that of atomic systems. Hence, they are considered as convenient model systems for fundamental studies of crystallization, melting and glass transition. Tata *et al.* (**page 1175**) have presented various self-assembly methods for fabricating polycrystalline as well as large-sized colloidal crystalline arrays of various types (hard-sphere, charged and stimuli-responsive) of submicron-sized nearly monodisperse spherical particles. Other techniques such as 'colloidal epitaxy' for fabricating large oriented colloidal crystals along the specified crystal directions and 'holographic optical tweezer technique' for organizing seed crystals with desired symmetry and lattice constants are discussed. The article also highlights various light-based techniques for charactering the crystal structure, disorder and stability in real and Fourier spaces.

Bathymetry and tsunami amplification

Tsunamis are a major hazard along many coastal zones of the world. The havoc wrought by the 2004 tsunami in several countries around Indian Ocean and the 2011 tsunami in Japan is of gigantic proportions in terms of loss of life and property, besides leaving permanent scars in the lives of the survivors. Tsunami preparedness of the coastal communities is, therefore, highly warranted in order to avoid repetition of such losses in future. Detailed mapping of the coastal zones showing elevations, slopes and morphological as well as land-use features forms a vital component of the tsunami preparedness since nature of coastal topography determines the risk level of any coast to tsunamis. Similarly, bathymetry, i.e. the underwater topography off the coastal zones also play a significant role in tsunami propagation and amplification. While tsunami travels at great speeds without losing energy in the deep ocean, its velocity and wavelength decrease, and its height increases the moment it starts feeling the bottom topography as it approaches the coast. More importantly, seaward concavities, if any, in the seabed contours cause tsunami convergence into such zones so that its height amplifies considerably to reach far inland, causing more damage in the coastal parts opposite such concavities than in the adjacent coastal lands. Nageswara Rao *et al.* (**page 1206**) with the help of pre- and post-2004 tsunami satellite images and the depth contours demonstrate the apparent relationship between the bathymetry and tsunami impact in some widely separated locations along Andhra Pradesh coast.

Characterization of traffic noise

An attempt has been made by Shukla *et al.* (**page 1193**) to characterize the traffic noise condition resulting from mixed traffic sources at a typical Indian city crossing in Kanpur City. The previous researches for characterization primarily relied on determination of equivalent or average sound pressure level for noise, which fail to define the noise condition from frequency perspectives. The article uses a new methodology for traffic noise characterization, giving importance to noise frequencies predominantly present in noise. The characterization also includes determining frequency-specific variation in noise levels with respect to time and location, and to relate the observations to possible associated health hazards. The analysed data indicate existence of noises of two predominant frequencies, i.e. 63 Hz at low frequency and 1 kHz at high frequency domains. Sampled observations indicate presence of fluctuations in the noise levels. Low-frequency noise is associated with throb, rumble or hiss; the high-frequency noise is adhered to impulsive, intrusive, percussive characters. Further, the comparison of the observed noise levels with equivalent preferred noise criteria and noise rating curves suggests that the stipulated limits were not met particularly at 1 kHz frequency for all sampling locations and for all sampling time slots and thus it is associated with potential health hazards.