In this issue

Particle image velocimetry

Flow visualization has been an integral part of fluid dynamics research over the years. In fact, it was L. Prandtl, who can be called as Father of Modern Fluid Dynamics, who developed ingeneous visualization techniques to show the subtle effects of viscosity like flow separation. However, flow visualization is a qualitative technique of fluid flow diagnostics and to get quantitative results one had to depend on use of hot wire or laser doppler anemometry. In unsteady flows, use of multiple hot wire probes is necessary to obtain velocity information over a spatial domain. In such situations there is always a doubt as to whether the probes themselves are effecting the flow. It is well known that some flow fields like tip vortex flow is sensitive to slightest perturbation. Therefore, there have been efforts to develop fluid flow diagnostics technique which can provide instantaneous velocity measurements over global (2D or 3D) domains with high accuracy. Particle Image Velocimetry (PIV) in fact does this.

Therefore, PIV has acquired a special status in current experimental fluid mechanics research and a timely review of this technique is provided by Ajay K. Prasad (**page 51**). The review article addresses the basics of the PIV technique such as PIV algorithms, optical considerations, tracer particles, illuminating lasers, recording hardware, errors in PIV measurements and PIV vector processing. This information will certainly be useful to those who would like to develop the technique.

V. H. Arakeri

Developments in instrumentation

Current Science publishes important developments in 'Instrumentation' from time to time, especially when such developments take place indigenously. One of the recent reports concerned 'SQUIDs –Highly sensitive magnetic sensors' by M. P. Janawadkar *et al.* (*Curr. Sci.*, 1999, **77**, 759–769).

The vibrating sample magnetometer (VSM) is one of the standard equipments for magnetic characterization of materials including thin magnetic films and other samples in small quantities. The instrument provides an absolute measure of the sample magnetization as a function of applied magnetic field and temperature with a sensitivity of nearly 10^{-4} emu. Using a loudspeaker kind of arrangement, a magnetized sample is vibrated in a homogenous magnetic field in the vicinity of a set of pick-up coils. The flux change caused by the moving magnetic sample causes an induction voltage across the terminals of the pick-up coils which is proportional to the magnetization/magnetic moment of the sample. To improve the sensitivity of the apparatus, the alternating voltage is measured using lock-in techniques. The signal in the coils is very small and therefore extremely sensitive to noise sources. Development of this type of instruments is a multi-disciplinary task involving electronics, physics, vacuum-, cryogenic- and mechanical-engineering technologies.

The paper entitled 'A precision, low-cost vibrating sample magnetometer' by A. Niazi *et al.* in this issue (**page 99**) deals with the development of a VSM at the School of Physical Sciences, Jawaharlal Nehru University, New Delhi. The authors claim that 'the performance compares very well with extremely costly imported systems'. It is hoped that this 'good piece of work' will be followed by the manufacture of several such systems for teaching and research.

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