

Original Paper

Applications of Laser Interferometry in Providing Traceable Vibration Measurements in India

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Abstract

The paper discusses the advantages of laser interferometry in providing traceable vibration measurements with lowest levels of uncertainty of measurement due to which it has been established as National primary standard. The potential high precision measurements can be achieved with air bearing exciters of beryllium armature having lowest transverse motion, by special vibration isolation and by data acquisition at a high sampling rate. The national standards briefly described are mainly used for the primary calibration of reference standard accelerometers which are used in accredited calibration laboratories. Strengths, weaknesses, opportunities and threats (*SWOT*) analysis of laser interferometer approach is discussed. The expanded measurement uncertainty ($k = 2$) of 0.3 to 1.8 % in range 5 Hz to 20 kHz was re-affirmed by absolute calibration of standard reference accelerometers by laser interferometry technique using multipoint laser positions.

Keywords

National Metrology Institute (NMI) – Laser interferometer – Sine approximation method (SAM) – Discrete Fourier transforms (DFT) – Uncertainty of measurement (UoM)