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Progress on Tunable Lasers for Ultrafast Processes and Applications - PTLUPA6

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Lasers contribute significantly to the science, technology and communication today. Ultrafast pulsed lasers are used to map the sequence of the events which take place in a system which has any photo-induced mechanism. Tunable lasers are useful in strong-field laser-matter interactions which is a rapidly advancing branch of physics. Progress in topics such as higher harmonic generation and quantum coherent control have led to the work on attosecond time-scales, laser based particle acceleration, and laser assisted nuclear fusion. Two main areas of contemporary research are: (1). Nano science and (2). Ultrafast time scale events. Time-durations of picoseconds (ps) or femtoseconds (fs) are generally termed as 'ultrafast' in time-domain spectroscopy. Fs is a billionth of a million of a second. The fastest laser pulse available today is ~2.9 fs. Although ultrafast lasers in ultraviolet (UV)-Visible and IR regions were available for last 30 years, it is now possible to generate ultrashort pulses in THz region and attosecond (10^{-2} fs) pulses in extreme UV (XUV) or X-ray regime.

In this proceedings besides a plenary talk, there are seven sections. First two sections are devoted to the tunable lasers and their applications in nonlinear optics. Section III deals with THz and sensors. Section IV gives the applications to metals, semiconductors and nanomaterials. Applications in remote sensing and optical interferometry are given in section V. Section VI gives the applications in ultrafast spectroscopy and fibre optics. Section VII deals with the biological and other applications. For the benefit of the young physicists, we have included an article on "Advice to Beginning Physics Speakers" by Professor Jim Garland at the end of the proceedings.



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