Area Seminar

Title	Generation of high-power, continuous-wave, optical radiation from visible to near-infrared
Date and Time	20/08/2009 16:00:00
Speaker	Goutam K. Samanta Professor ICFO-The Institute of Photonic Sciences, Spain
Area	Theoretical Physics
Venue	Room No. 469

Abstract

Although lasers have been in use for nearly 50 years, unavailability of the suitable laser gain materials precluded the development laser systems that can cover many regions of the optical spectrum, from ultraviolet (UV) and visibl to the near and mid-infrared wavelength range, with potential applications in the fields such as spectroscopy, remote sensing, trace gas detection, and many more. On the other hand, nonlinear optics has evolved as a powerful technique to generate tunable optical radiation inaccessible to ordinary lasers. Based on nonlinear effect, the optical parametric oscillators (OPOs) has become a standard device to convert a fixed laser wavelength to wide band of coherent radiation ranging from visible to far-IR. Development of continuous-wave (cw) OPOs in singly-resonant oscillator (SRO) configurations, the focus of this talk, is challenging due to the high threshold pump power (several watts). In addition, with visible pumping, photorefractive effect and thermal lensing effects become important issues to overcome. Therefore, the realization of practical cw SROs requires optimal cavity design, suitable nonlinear materials, and high-power laser with high spectral and spatial quality. In this talk, I will describe the development of advanced SRO systems based on the latest generation of quasi-phase-matched nonlinear materials, which are capable of providing cw, single-frequency radiation at unprecedented power levels exceeding 1 W and broad spectral coverage in the visible and near-infrared wavelength regions. The talk will also include some background on the origin of nonlinear optical effects, crystal optics, phase-matching and applications of OPO sources. visible to near-infrared