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Tutorial workshop on Non-Linear Optics Light Matters 2016

26 - 27 AUG 2016 @ PRASANTHI NILAYAM CAMPUS

Department of PHYSICS

SSSIHL 2016/17

Invited Expert Lectures by:

Dr. Soma Venugopal Rao (SVR) University of Hyderabad.

Dr. P. Prem Kiran (PPK) University of Hyderabad.

Dr. Sivarama Krishnan (SRK) IIT Madras.

DAY 1 – Fri, 26 Aug 2016

Introduction to NLO / Review: (SVR)

Lecture 1: (SVR1) (Review) Description of Nonlinear interactions, Wave equation for nonlinear media; Coupled wave equation for sum frequency generation,

Introduction to Nonlinear Optical Phenomenon

Lecture 2: (SVR2) Tensor nature of third order susceptibility, Optical phase conjugation, optical bistability, optical switching

Lecture 3: (SVR3) Intensity dependent refractive index, self-focusing of light, Z-scan, Thermal nonlinear optical effects, resonant vs Non –resonant Nonlinearities

Lecture 4: Popular Lecture (PPK)

Overview of Ultrafast laser pulses: From Basics to Applications and Challenges

DAY 2 – Sat, 27 Aug 2016

Ultrafast Pulse generation and Characterization:

Lecture - 5: (PPK1) Basics of Ultrafast laser pulse generation:

Importance of nonlinear optical processes; Mode-locking concepts; different types of sources available.

Lecture 6: (PPK2)

- » Characteristics of ultrashort laser pulses, focusing of ultrashort pulses; Spatio-Temporal Effects
- » Characteristics and Measurement of ultrashort pulses, Basics of Autocorrelation: Wigner Distribution,
- » Dispersion and propagation of ultrashort pulses, GVD, Pulse shaping
- » Quick Glance of: Measurement of ultrashort laser pulses: Frequency resolved optical gating (FROG) and spectral phase interferometry for direct electric field reconstruction (SPIDER)

(Propagation of ultrashort pulses: Self-focusing, Filamentation, Theoretical Formulation Applications of ultrashort pulses: Ultrafast spectroscopy, interferometry,)

Nonlinear Phenomena, Applications devices: (SRK)

Lecture 7: (SRK 1) Ultra-short pulse propagation equation in isotropic and anisotropic medium and interpretation; Solitons;

Lecture 8: (SRK 2): Basics of Stimulated Raman Scattering and Basics of Stimulated Brillouin Scattering, Basics of Electro-optic and Acousto-Optic effects, Introduction to Optical Damage and Multiphoton Absorption.

