Proceeding of

3rd NATIONAL CONFERENCE

on

Materials for Modern World

(NCMMW - 2016)

September 15 - 16, 2016

Editors

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Dr. S. Elangovan

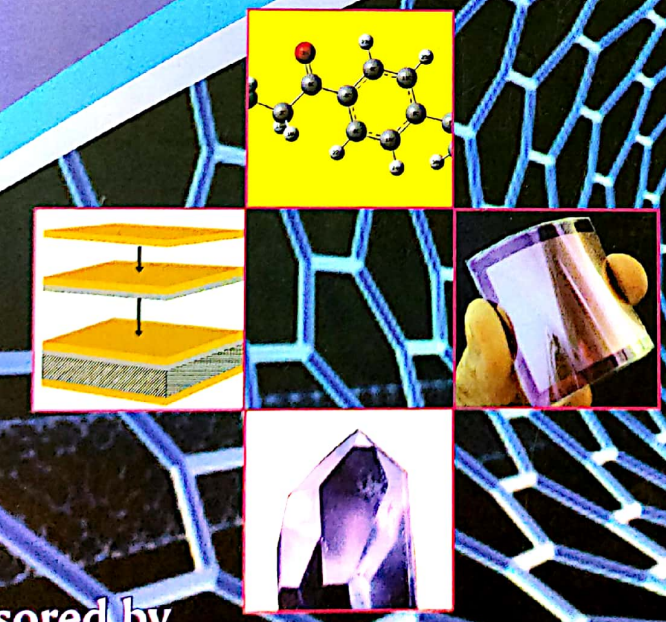
Organised by

Department of Physics

Easwari Engineering College

Ramapuram, Chennai - 600 089.

Tamil Nadu, India.



Sponsored by

Department of Atomic Energy -

Board of Research in Nuclear Science (DAE - BRNS)

First Impression 2016

ISBN 978 81 89 843 16 8

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Investigations on Preparation and Characterizations of Zinc Selenide (ZnSe) Thin Film

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Effect On Transient Metal Doped Cadmium Sulfide Thin Film By The Method of Chemical Bath Deposition

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Sources of Radiation – Comparison With Natural and Manmade; In Specific Nuclear Power Plants

Vidhya Sivasailanathan[1,3], Prabhat Kumar[2], Suresh Sagadevan[3]

Novel Design of Metafiber With Framed Anisotropic Metamaterial Cladding and Air Core for High Birefringence

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Novel design of metafiber with framed anisotropic metamaterial cladding and air core for high birefringence

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We intend to offer a design of optical fiber framed with elliptical hollow core and an anisotropic metamaterial (AMM) cladding which is proved to possess an excellent experimental potentiality. The integration of metamaterial with the elliptical core fiber paved us a new way to have higher birefringence, as the effective parameters of the medium can be varied with much of ease. The birefringence in this case, arises due to the perturbed (elliptical) core and also with the metamaterial used in the cladding which is anisotropic in nature. We theoretically analyze the birefringence of the designed fiber over different wavelengths (ranging from ultraviolet to infrared) for various metal (silver) and dielectric (Al_2O_3) concentrations in the structured AMM. The length over which the state of polarization (SoP) can be regained (beat length) and also the phase birefringence are analyzed numerically as much as with different metal/dielectric concentrations of the designed metamaterial. And are plotted using finite element method (FEM). We conclude from our analysis that the fiber with framed AMM cladding and hollow elliptical core have higher birefringence at metal/dielectric ratio at the incident wavelength of 900 nm and naturally the shortest beat length and the highest phase birefringence are also found to be at the same wavelength of incidence. Hence the designed fiber finds various applications such as polarization maintaining fibers and high birefringent fibers.

Keywords: Optical fiber, Metamaterial, AMM cladding, Birefringence, Elliptical core.