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SOLITARY WAVE PROSPECTS OF METAMATERIALS

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ABSTRACT

Modern day researchers have developed artificially structured material composites, call
`metamaterials' that possess significant potential to provide electromagnetic properties that a
quite unusual and are not found in nature. This article is aimed at giving an introductory revie
of this class of `designer materials' and a study on the switching dynamics of solitary wa
through fiber made of metamaterial core.

Keywords: metamaterial, Negative refractive index material, optical fiber, soliton solutio
dispersion nonlinearity.

INTRODUCTION

Metamaterial, the promising avenue of intense and widespread interest, are artificial
constructed structures exhibiting unconventional characteristics that have never been observed i
nature before. The pioneering demonstration of the very important property of negative inde
behavior was carried out in metamaterials made with split ring resonators (SRRs) and wir
structures in the microwave frequencies [1]. Armed with new nanofabrication techniques
researchers could artificially engineer sub wavelength structures and push up the operation
frequency range of NIMs to THz and optical frequencies. The path attaining negative-inde
behaviour from far-, mid-, near-infrared, to visible wavelengths saw many theoretical predictions
followed by the engineering of a variety of metamaterial structures worldwide [2-7]. An array of
metallic, subwavelength elements embedded in a homogeneous host material simulating electric
and magnetic dipoles to attain the negative refractive index response is the

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