

GEORGETOWN UNIVERSITY

Department of Mathematics

COLLOQUIUM

Propagation of electromagnetic pulses in
doubly-resonant optical media

Speaker: Professor Victor Roytburd

Rensselaer Polytechnic Institute

Friday, November 6 2009
3.15 p.m. St. Mary's 326

Abstract: Over the last few years there have been exciting achievements in designing artificial optical materials (metamaterials) with very unusual properties. For example, in some frequency regimes, they may be "left-handed" (with the left-oriented triplet of the electric, magnetic, and wave vector) and even have a negative refractive index. One of the most exotic and amazing applications of the ability to manipulate the refractive index is the design of "invisibility cloaks." The experimental realization of the left-handed property is based on the resonant response of the artificial material to both electric and magnetic fields.

I will give a hopefully accessible introduction to the left-handed materials. In the second half of the talk I will discuss our recent results (theoretical and computational) on propagation of extremely short electromagnetic pulses for a simple model of homogeneous doubly-resonant media, where oscillators with cubic nonlinearities represent the dielectric response of the medium, and the harmonic oscillators represent the magnetic response.

Refreshments will be served after the talk.