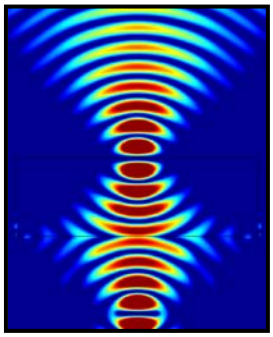
INSTITUTE FOR PURE AND APPLIED MATHEMATICS

Los Angeles, California



Metamaterials: Applications, Analysis and Modeling

January 25 - 29, 2010

ORGANIZING COMMITTEE: **Susanne Brenner** (Louisiana State); **Maria-Carme Calderer** (University of Minnesota, Twin Cities); **Tatsuo Itoh** (UCLA); **Robert Kohn** (New York University, Co-Chair); **Jichun Li** (University of Nevada, Las Vegas); **Graeme Milton** (University of Utah, Co-Chair); **Chi-Wang Shu** (Brown); **Richard Ziolkowski** (University of Arizona)

Scientific Overview

Metamaterials are artificially structured media with unique and exotic properties not observed in natural materials. These include, for example electromagnetic materials with permittivity and permeability both designed to achieve novel effects, such as a negative refractive index, and elastic materials configured to give a negative or anisotropic effective mass density at a given frequency. They are typically constructed from high contrast materials, and the macroscopic fields needed to describe their effective behaviors are not simple averages of the local fields. They frequently gain their properties from microscopic resonances. The potential applications of such materials are growing and include lenses that have subwavelength focussing, and electromagnetic and acoustic cloaks that hide objects and leave incoming waves unscattered. Metamaterials also include materials for which the equations governing their continuum electromagnetic or elastodynamic macroscopic behavior are unlike any found in nature. This workshop brings together three groups of people: physicists and engineers working on metamaterials and their applications; mathematicians who are studying homogenization in high contrast materials and who are providing a greater understanding of the mathematics of metamaterials; and numerical analysts interested in the solving the microscopic and macroscopic equations governing the behavior of metamaterials. Many challenges remain, such as seeking a better understanding of what novel behaviors and applications metamaterials can achieve in practice; exploring what is theoretically possible by homogenization theory; and finding efficient and accurate numerical algorithms for solving the partial differential equations to accelerate progress in the field.

Confirmed Speakers

Guy Bouchitte (Université de Toulon et du Var); **Wei Cai** (University of North Carolina); **Maria-Carme Calderer** (University of Minnesota, Twin Cities); **Christophe Caloz** (University of Montreal); **George Eleftheriades** (University of Toronto); **Nader Engheta** (University of Pennsylvania); **Shanhui Fan** (Stanford); **Sebastien Guenneau** (University of Liverpool); **Ronald Hoppe** (University of Houston); **Tatsuo Itoh** (UCLA); **Steven Johnson** (MIT); **Maria Kafesaki** (University of Crete); **Natasha Litchinitser** (SUNY Buffalo); **Vitaly Lomakin** (University of California, San Diego); **Peter Monk** (University of Delaware); **Alexander Movchan** (University of Liverpool); **Evgenii Narimanov** (Purdue); **Ben Schweizer** (Universitat Dortmund); **Ping Sheng** (Hong Kong University of Science and Technology); **Chi-Wang Shu** (Brown); **Valery Smyshlyaev** (University of Bath); **Michael Vogelius** (Rutgers University); **Richard W. Ziokowski** (University of Arizona).

Participation

Additional information about this workshop including links to register and to apply for funding, can be found on the webpage listed below. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission, and we welcome their applications.

www.ipam.ucla.edu/programs/meta2010

IPAM is an NSF funded institute