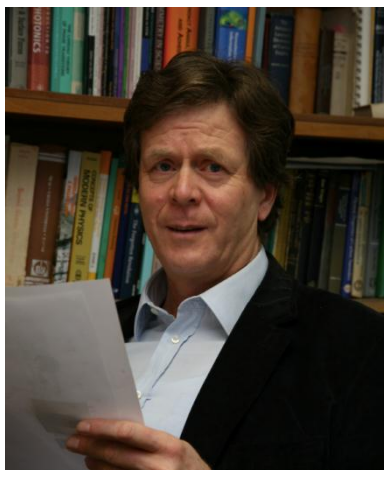
BIG energy seminar series

Addressing the scale and complexity of the global energy challenge.



Topological soft materials for all-optic low energy photonics

Igor Muševič. Ph.D.

Date: Friday, February 8th, 2013 at 1:30p.m.
Location: Duane Physics D142

Abstract:

The existing infrastructure for managing the flow of information along the photonic pathways and in our computers is in most segments based on electrically encoded information and the transport of electric charges using the electric force. This process is limiting the speed of signal propagation and is costly in terms of energy dissipation. The predicted worldwide energy consumption of data centers for 2050 is approaching the electric energy generated in the European Union in 2010! It is anticipated that our 21st century civilization should turn to photonics and photonics signaling that will not only exploit the energy of our Sun, but will also use all-photonic processing of information in computers and communications. In this lecture we shall discuss a new class of photonic materials that is based on dispersions of colloidal particles in liquid crystals. Unlike ordinary water based colloids, nematic colloids are showing several novel classes of colloidal forces, which do not exist in isotropic solvents. They are also a new class of topological materials, where the colloidal interactions are dictated by the topology of the liquid crystal, resulting in the formation of knotted and linked colloidal soft matter. We will give an overview of this exciting and rapidly developing field, merging material science, topology and photonics, together with some spectacular examples of self-assembly and applications to soft matter photonics.

BIO:

Igor Musevic is an experimental physicist (PhD-University of Ljubljana, Slovenia), specialized in liquid crystals, surfaces and colloidal self-organization. He joined J.Stefan Institute in Ljubljana, Slovenia, in 1979. His early research topic was the technology of liquid crystal displays. In 1980 he started optical studies of ferroelectric liquid crystals in very high magnetic fields in collaboration with University of Nijmegen in Netherlands and Max Planck Institute in Grenoble, France. In 1993 he founded the SPM laboratory at JSI and initiated the studies of surface forces mediated by liquid crystals using AFM. His interest was also in the dynamics and phase transitions in ferroelectric liquid crystals. After the year 2000 his interest shifted to STM studies of single atom manipulation using STM at low temperatures, self-organization of particles in liquid crystals and photonics of soft matter. He is full Professor of Physics at the University of Ljubljana and the head of Condensed Matter Department at JSI.

Campus Map: Duane Physics: http://www.colorado.edu/campusmap/map.html?bldg=DUAN

Sponsored by The Department of Physics and the Renewable and Sustainable Energy Institute (RASEI)

rasei.colorado.edu