

The Department of Physics and Astronomy
Presents Research Seminar Speaker

Dr. Zlatko Koinov

Professor
Department of Physics and Astronomy
University of Texas at San Antonio



Friday March 26, 2010

Time: 3:00-4:00 p.m.

Location: MB 0.302

Spontaneous symmetry breaking in semiconductors, superconductors and Fermi gases trap into optical lattices

Spontaneous breakdown of symmetry means that the medium is characterized by an order parameter which is not a scalar under the symmetry operation. A small change in the order parameter induced by a symmetry operation will generate a massless mode (excitation). This statement is known as the Goldstone theorem. In my talk I will discuss three different phenomena where the above theorem holds: the Bose-Einstein condensation of excitons in semiconductors, the formation of Cooper pairs in high-temperature superconductors and the ultracold Fermi gas of Li atoms trapped into an optical lattice. In particular, I will present a unified description of the massless Goldstone modes which is based on the Bethe-Salpeter equation for the collective excitations.