NEW YORK CITY COLLEGE OF TECHNOLOGY
Joint Physics and Mathematics Colloquium

Dynamical Symmetry in Condensed Matter Physics

Presented by:

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Thursday, December 15 at 12:45 p.m.
Namm, Room 804

Abstract

The talk will present three themes of our current work:
i)Inonu-Wigner (IW)contraction of Dynamical Symmetry and Quantum Phase Transitions;
ii)Dynamical Symmetry and Competition/Coexistence of Superconductivity and Charge & Spin Density Waves ,and Superconductivity and Near Ferroelectricity;
iii)Symmetry Breaking in Finite Quantum Systems
i)Our approach to Quantum Phase Transitions identifies the IW contraction parameter in a parent system with initital dynamical symmetry as normalized physical coupling coefficients which can be externally controlled on the range [0,1]. Using different contraction paths, the initial parent symmetry contracts to different resulting symmetries. The initial order parameters can be followed to the singular point of the new contracted dynamical algebra and the predicted order of the transition determined.Illustration will be given using the su(2) to e(2),or h(4) contraction
ii) Dynamical Symmetry models of su(8) ["Grand Unified"] for Superconductivity and Charge and Spin Density Waves (SC-CDW/SDW), and of su(2)Xh(4) for Superconductivity and Near-Ferroelectricity (SC-NFE) will be presented .Calculation of order parameters and phase boundaries for SC-DW will be given. A new magneto-polarization effect for SC-NFE systems hsbeeb predicted.
iii)Some peculiarities of symmetry breaking in finite systems versus "infinite" systems will be illustrated.

Light refreshments will be served.