

Physics Colloquium

Michigan Technological University

February 24 (Thursday) 4:00 to 5:00 pm
Room 139, Fisher Hall

RCI Calculations of Atomic Properties of Mo VI

Lin Pan

Adviser: Professor Donald R. Beck

This talk is about Relativistic Configuration Interaction (RCI) calculations on Mo VI, especially on the Mo VI $4p^5 4d^2 J=5/2$ levels. The internally excited $4p^5 4d^2$ configuration has long been known as a strong perturber of the nf series of the one-electron spectra in Rb isoelectronic sequence. So far, Mo VI $4p^5 4d^2$ levels are the only levels of the $4p^5 4d^2$ configuration that have been studied in the Rb isoelectronic sequence. There are only two sets of experimental data available for these levels. Besides, huge discrepancies exist between these available data for some of the energy levels. Our RCI calculations on the 11 energy levels of Mo VI $4p^5 4d^2 J=5/2$ confirms almost all the LS compositions predicted by one experimental work. But our energy levels generally disagree with both of them. Computational difficulties in approaching this system and our efforts to get the levels "correct" will be discussed in the talk. Two thirds of the RCI results for f-values (oscillator strength) for transitions $4p^6 nd$ ($n=4,5,6$) \rightarrow $4p^6 nf$ ($n=4,5,6$), $4p^5 4d^2 J=5/2$, are predicted for the first time.

The role of Spontaneous Symmetry Breaking in Dark Energy Models

Bijunath Patla

Advisor: Professor Robert Nemiroff

A fairly well established fact today is that Dark energy rules the Universe. Scalar fields are one of the many possible contenders which could explain the existence of Dark Energy in the universe today. Characterized with a negative pressure the scalar fields can be emergent entity in various versions of Field theory and String theory models. But not all scenario require symmetry breaking to precede the emergence of the scalar fields. Is Spontaneous Symmetry Breaking an inherent feature in all the generic dark energy models? What are the implications of broken/hidden symmetries in nature? An attempt will be made to shed some light on the above aspects.