Variable Speed of Light Research Project

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The research project I have selected with the guidance of Dr. Bharath Narayanan is to explore the basic mathematics of the Variable Speed of Light (VSL) theory.

In a paper titled, "A Time Varying Speed of Light as a Solution to Cosmological Puzzles," Andreas Albrecht and Joao Magueijo discuss the implications of a variable speed of light in the early stages of the universe. They propose corrections to the cosmological evolution equations with a changing c and demonstrate how this helps solve some cosmological problems. Two important examples are the age of the universe and a reason for the current value of "c" for the speed of light.

Specifically, in this first semester of research, the focus will be on constructing and verifying some calculations that demonstrate a specific realization of the VSL theory in elementary terms – applying the VSL to electrodynamics of the point particle in Minkowski space showing how a VSL formulation can be an alternative to current methods. Magueijo goes on to perform the same exercise using the Einstein-Hilbert action and concludes by putting the key elements of the construction into 4 axioms.

The goal of my research this semester is to work through and verify these calculations and axioms. After successfully completing all the calculations and argument put forth, I would like to explore further applications of these axioms.

References:

1) Andreas Albrecht and Joao Magueijo, *A Time Varying Speed of Light as a Solution to Cosmological Puzzles*. 1999