Vita

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Universities
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Presentations:

Atlantic General Relativity Meeting 2021

UNB Graduate Research Conference 2021

CAP 2021 Virtual Congress

Analyzing Loop Quantum Cosmology of Bianchi I, II and IX Space with Numerical Methods

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Timothy E. Blackmore

in the Department of Physics

U.N.B., Fredericton, N.B.

Tuesday, April 26th, 2022
12:00 p.m.

Via MS TEAMS

Examining Committee
Dr. Edward Wilson-Ewing   Supervisor
Dr. Dennis Tokaryk   Internal Examiner
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Dr. Abdelhaq Hamza   Chair of Oral Examination

Abstract

General Relativity (GR) and Quantum Mechanics (QM) are not compatible. This becomes problematic at large mass densities where we expect the effects of both to be significant. Loop Quantum Gravity (LQG) is a method to quantize GR so that it is compatible with QM. In previous literature effective Hamiltonian equations have been found for the anisotropic vacuum Bianchi I, II, and IX spaces with LQG effects. These effective Hamiltonian equations govern the evolution of these spaces. Also, transition rules have been derived for these spaces governing their rates of expansion and contraction. For this project, we solve the effective Hamiltonian equations numerically to test these transition rules, and to understand the dynamics when the assumptions underlying the transition rules are not satisfied.