NUS
National University
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MA4198 PROJECT PROPOSAL (PROJECT CUM SEMINAR GROUP)

SUPERVISOR'S INFO

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PROJECT ID: PS2410-09

TITLE

Maxwell's Equations in Curved Space Time

BRIEF DESCRIPTION OF PROJECT

Maxwell's equations are a set of fundamental equations that governs the propagation and interaction of electric and magnetic fields. They are the foundation for Einstein's work on relativity, and eventually to the celebrated Standard Model. In this project, we will first derive Maxwell's equations from Gauss, Faraday, and Ampere laws in 3-dimensional Cartesian coordinates. Subsequently, to incorporate special relativity, we will express Maxwell's equations as tensor fields.

EXPECTATION/S

Read and understand the book "Introduction to Smooth Manifolds" By John M Lee, and the honors thesis "Maxwell's Equations, Gauge Fields, and Yang-Mills Theory" by Nicholas Alexander Gabriel, and to be able to explain their findings to project mates and supervisor. Students will be given a tangible item to represent the group identity.

PREREQUISITE/S (at level 3000 or below, with at most one course at level 3000)

MA2104

READING REFERENCE/S

Introduction to Smooth Manifolds by Lee Maxwell's Equations, Gauge Fields, and Yang-Mills Theory by Gabriel All materials are available for free online.