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S E M I N A R

Static models in Einstein-Gauss-Bonnet gravity

Shavani Naicker
University of KwaZulu-Natal

Date:
Thursday, 17 October 2024

Time:
12h15-13h15 SAST

Venue:
- NITheCS Seminar Room
  University of KwaZulu-Natal
  Westville Campus
  3rd Floor, H-Block,
  School of Chemistry and Physics
- Online

Refreshments will be served

WHO SHOULD ATTEND?
This talk is intended to be accessible to postgraduate students. All are welcome!

ENQUIRIES:
Email Neli Mncube:
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ABSTRACT:
In this talk, a framework to study spherically symmetric static distributions in Einstein-Gauss-Bonnet (EGB) gravity is presented. EGB gravity is second order Lovelock gravity in which Lovelock gravity represents a natural extension of general relativity to higher dimensions. EGB gravity is one of the most promising higher order curvature theories as second order equations of motion still arise, pathologies are avoided and energy conservation is preserved. The matter distribution considered is a neutral fluid. We seek to solve these field equations as this will provide insights on the physical features of the stellar model. This is done by assuming isotropic pressure and solving the resulting differential equation. This process of finding exact solutions in any gravitational field theory serves as a foundation for modelling stellar objects. We show that the condition of pressure isotropy is an Abel differential equation of the second kind, a complicated first order nonlinear differential equation. Such equations are difficult to solve however we illustrate a method to reduce it to a canonical differential equation. This systematic approach allows for exact solutions to the canonical equation to be found, which is unique from the methods considered in general relativity. Furthermore, the effects of the electromagnetic will also be discussed.

Shavani Naicker is a final year PhD student in Applied Mathematics at the University of KwaZulu-Natal School of Mathematics, Statistics and Computer Science.

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