



Canadian Association  
of Physicists

Association canadienne  
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Contribution ID: 3652 Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

## **(G\*) Unified Interacting Quark Stars in 4D Gauss-Bonnet Gravity**

*Wednesday 21 June 2023 14:30 (15 minutes)*

Since the derivation of a well-defined  $D \rightarrow 4$  limit for 4D Gauss-Bonnet (4DGB) gravity coupled to a scalar field, there has been interest in testing it as an alternative to Einstein's general theory of relativity. Using the Tolman-Oppenheimer-Volkoff (TOV) equations modified for 4DGB gravity, we model the stellar structure of quark stars (QS) using a novel interacting quark matter equation of state, since it is feasible that some of the stranger gravitational wave observations may have come from QS systems. We find that increasing the Gauss-Bonnet coupling constant  $\alpha$  or the interaction parameter  $\lambda$  both tend to increase the mass-radius profiles of QS described by this theory, allowing a given central pressure to support a larger QS in general. Additionally, we analytically identify a critical central pressure, below which no QS solutions exist due to the pressure function having no roots.

### **Keyword-1**

quark stars

### **Keyword-2**

4d gauss bonnet

### **Keyword-3**

modified gravity

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**Session Classification:** (DTP/DNP/PPD) W2-4 Advances in Nuclear and Particle Theory | Progrès dans la théorie nucléaire et la théorie des particules (DPT/DPN/PPD)