Contribution ID: **417** Type: **Talk in the parallel session**

Stelle Gravity as the limit of Quantum Gravity with a momentum cutoff

Wednesday, 7 July 2021 10:20 (25 minutes)

Many quantum gravity theories predict several interesting phenomenological features such as minimal length scales and maximal momenta. Generalized uncertainty principles (GUPs), which are extensions of the standard Heisenberg uncertainty principle, have proven very useful in modelling the effects of such features on physics at sub-Planck energy scales. In this talk, we use a GUP modelling maximal momentum to establish a correspondence between the GUP modified dynamics of a massless spin 2 field and Stelle gravity with suitably constrained parameters. Thus, Stelle gravity can be regarded as the classical manifestation of the imposition of a momentum cutoff at the quantum gravity level. We then study the applications of Stelle gravity to cosmology. Specifically, we analytically show that Stelle gravity, when applied to a homogeneous, isotropic background, leads to inflation with exit. Lastly, using numerical simulations and data from CMB observations, we obtain strong bounds on the GUP parameter. Unlike previous works which fixed only upper bounds for GUP parameters, we show that we can bound the GUP parameter from above *and* from below.

Primary authors: Mr NENMELI, Vijay (Department of Physics, Indian Institute of Technology, Bombay); Dr SHANKARANARAYANAN, Subramaniam (Department of Physics, Indian Institute of Technology, Bombay); Dr TODORINOV, Vasil (Department of Physics and Astronomy, University of Lethbridge); Dr DAS, Saurya (Department of Physics and Astronomy,University of Lethbridge)

Presenter: Mr NENMELI, Vijay (Department of Physics, Indian Institute of Technology, Bombay)

Session Classification: Quantum Gravity Phenomenology

Track Classification: Quantum Gravity: Quantum Gravity Phenomenology