Contribution ID: **273** Type: **Talk in the parallel session**

Effective field theory from Relativistic Generalized Uncertainty Principle

Wednesday, 7 July 2021 09:55 (25 minutes)

Theories of Quantum Gravity predict a minimum measurable length and a corresponding modification of the Heisenberg Uncertainty Principle to the so-called Generalized Uncertainty Principle (GUP). However, this modification is non-relativistic, making it unclear whether the minimum length is Lorentz invariant. We formulate a Relativistic Generalized Uncertainty Principle, resulting in a Lorentz invariant minimum measurable length and the resolution of the composition law problem. This proved to be an important step in the formulation of Quantum Field Theory with minimum length. We derived the Lagrangians consistent with the existence of minimal length and describing the behaviour of scalar, spinor, and U(1) gauge fields. We calculated the Feynman rules (propagators and vertices) associated with these Lagrangians. Furthermore, we calculated the Quantum Gravity corrected scattering cross-sections for a lepton-lepton scattering. Finally, we compared our results with current experiments, which allowed us to improve the bounds on scale at which quantum gravity phenomena will become relevant.

Primary author: TODORINOV, Vasil (University of Lethbridge)

Co-authors: Prof. DAS, Saurya (University of Lethbridge); Prof. BOSSO, Pasquale (Universit of LEthbridge)

Presenter: TODORINOV, Vasil (University of Lethbridge)

Session Classification: Quantum Gravity Phenomenology

Track Classification: Quantum Gravity: Quantum Gravity Phenomenology