



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 3001

Type: **Invited Speaker** / **Conférencier(ère) invité(e)**

(I) Causality and modifications to Einstein's gravity

Wednesday 8 June 2022 15:15 (30 minutes)

Does our world respect causality at all energy scales? We explore constraints on gravitational dynamics which stem from this assumption. Parameterizing long-distance effects of possible new heavy particles using effective field theory (EFT), we study causality of 2 to 2 scattering processes. Due to its energy growth, the gravitational force turns out to be particularly difficult to modify. I will present two-sided bounds which show that a wide class of modifications to four-dimensional Einstein's gravity, require either the existence of light higher-spin states, or violation of causality as we understand it.

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Session Classification: W3-2 Frontiers in Theoretical Physics I (DTP) | Frontières en physique théorique I (DPT)

Track Classification: Technical Sessions / Sessions techniques: Theoretical Physics / Physique théorique (DTP-DPT)