Canadian Association of Physicists

Association canadienne des physiciens et physiciennes

Contribution ID: **3531** Type: **Plenary Speaker / Conférencier(ère) plénier(ère)**

Thinking Effectively About Gravity (the view from below)

Thursday 9 June 2022 15:45 (45 minutes)

We live at a time of contradictory messages about how successfully we understand gravity. General Relativity seems to work well in the Earth's immediate neighbourhood, but arguments abound that it needs modification at very small and/or very large distances. This talk tries to put this discussion into the broader context of similar situations in other areas of physics, and summarizes some of the lessons which our good understanding of gravity in the solar system and elsewhere has for proponents for its modification over very long and very short distances. The main message is mixed: On one hand short-distance quantum effects are notoriously difficult to control in gravity and cosmology seems to like features (like light scalars and small vacuum energies) that are not generic to the long-wavelength limit of fundamental theories. These are crucial clues that would be silly to ignore. On the other hand, General Relativity successfully passes many stringent new observational tests and also seems to be almost unique in its ability to reconcile quantum effects with gravity on longer distances without being inconsistent. Neither of these seems to offer much scope for modification. I try to organize what the successes of GR might be telling us, and provide a score-card about it says about the various alternatives that have been proposed.

Author: BURGESS, Clifford (High Energy Physics Group - McGill University)

Presenter: BURGESS, Clifford (High Energy Physics Group - McGill University)

Session Classification: R-PLEN1 Plenary Session | Session plénière - Cliff Burgess

Track Classification: Herzberg Public and Plenary Talks / Conférenciers des sessions Herzberg et plénières