Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **2032** Type: **Invited Speaker / Conférencier(ère) invité(e)**

Open EFTs and Gravity as a Medium (I)

Wednesday 13 June 2018 14:30 (30 minutes)

Precision calculations in de Sitter space (such as of inflationary predictions for primordial fluctuations) are often plagued by infrared problems and issues of secular time dependence. Similar issues about the breakdown of perturbation theory seem also to arise for information loss in black holes. This talk briefly summarizes how related problems can arise in other areas of physics, and how they are dealt with when they do. It is argued that Master-Equation/Lindblad techniques used in areas like optics also apply to cosmology (and possibly black holes) and can tell us how to extract reliably late-time predictions. Applied to inflation they lead to Starobinsky's stochastic methods, plus small but important corrections. This is argued to explain why stochastic inflation seems to resum IR effects in simple examples, and allows these tools to be generalized to apply more broadly. Mentioned in passing the relevance of Open EFTs to the problem of Schrodinger's Cosmologist: how primordial quantum fluctuations decohere sometime between their production during inflation and their observation early in the later Big Bang Epoch.

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Session Classification: W3-3 Fields and Strings II (DTP) | Champs et cordes II (DPT)

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