Department of Mathematics,
University of California San Diego

* *

Colloquium

Dr. Aidan Chatwin-Davies

University of British Columbia

Gravity, Sampling, and the Early Universe

Abstract:

Information theory provides a mathematical framework for quantifying information processing tasks such as storage, computation, and communication. Connecting the abstract theory to concrete physical systems often gives insight into a system's physics; conversely, physics can often inspire new ideas in information theory itself. This perspective has been particularly fruitful in quantum gravity, for which the essential question is to understand how information is stored and processed by gravitating systems, such as black holes or even the Universe itself. In this talk we will see how quantum gravitational considerations lead to an extended Nyquist-Shannon sampling theorem for fields on Lorentzian manifolds. Applying the results to the physics of the early Universe leads to predictions for cosmological signatures of quantum gravity that can be tested with present-day observations of the cosmos.

Host: David Meyer

February 21, 2023

4:00 PM

APM 6402

Research Areas

Mathematical Physics

* *