



# INSTITUTE COLLOQUIUM

**Friday, 2 January 2015**

**4:00 p.m.**

**Fermion**

**Speaker:**

**Hugo Touchette**

*National Institute for Theoretical Physics (NITheP)  
Stellenbosch, South Africa*

**Title:**

**Large deviation theory: From mathematics to physics and back**

**Abstract:**

I will give in this talk a basic overview of the theory of large deviations, developed by Varadhan (Abel Prize 2007) in the 1970s, and its applications in statistical physics. In the first part of the talk, I will discuss the basics of this theory and its historical sources, which can be traced back in mathematics to Cramer (1938) and Sanov (1960) and, on the physics side, to Einstein (1910) and Boltzmann (1877). In the second part, I will show how the theory can be applied to study equilibrium and nonequilibrium systems and to express, from a more general perspective, many key concepts of statistical physics in a clear and unified way.

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