NATHAN PAGLIAROLI, Western University

Liouville Quantum gravity from Noncommutative Geometry

In this talk we will highlight recent developments in toy models of Quantum Gravity originating from Noncommutative Geometry. The models of interest are finite real spectral triples equipped with a path integral over the space of possible Dirac operators, dubbed Dirac ensembles. In the noncommutative geometric setting of spectral triples, Dirac operators take the center stage as a replacement for a metric on a manifold. Thus, this path integral serves as a noncommutative analogue of integration over metrics, a key feature of a theory of quantum gravity.

Such models can be shown to be bi-tracial random matrix integrals. Using well-established rigorous techniques of Random Matrix Theory, we derive the critical exponents and the asymptotic expansion of partition functions of various Dirac ensembles which match that of minimal models from Liouville conformal field theory coupled with gravity.