The emergent inflationary universe in quantum reduced loop gravity: primordial perturbations and their power spectra

Javier Olmedo[1], Emanuele Alesci[2]

1. Department of Physics and Astronomy,
Louisiana State University, Baton Rouge, LA 70803-4001
2. Institute for Gravitation and the Cosmos,
Penn State University, University Park, PA 16801

In this talk I will discuss the effective dynamics and potential predictions of a new emergent-universe model recently derived within Quantum Reduced Loop Gravity and based on the so-called statistical regularization scheme. These effective geometries show a dynamical transition from a stationary spacetime, with nearly constant scale factor at very early times, to a late-time semiclassical phase well approximated by a Friedmann-Robertson-Walker spacetime in Loop Quantum Cosmology. Our numerical analysis shows that this is always the case when the matter content is a minimally coupled scalar field subject to a quadratic potential, including the massless case. Besides, a finite period of (nearly) exponential expansion at late times can take place. Hence, we incorporate cosmological scalar and tensor perturbations, with a well-defined dynamics, and compute their power spectra at the end of this exponential expansion. I will discuss our results and compare them with the bouncing scenario of Loop Quantum Cosmology.