

Daniele Oriti, LMU München

Tensorial group field theories: quantum geometry and emergent cosmology

We introduce the basic elements of tensorial group field theories (TGFTs) for quantum gravity, emphasizing how they encode quantum geometry, the structure of their quantum states and the role of entanglement, and their relation with canonical loop quantum gravity and spin foam models. We then discuss briefly the issue of continuum limit, and summarize work on the renormalization of TGFT models. We overview recent results on the extraction of an effective cosmological dynamics from TGFTs, inspired by the idea of our universe as a quantum gravity condensate. In this context, we emphasize: the need for appropriately coarse-grained states capturing collective dynamics and the role of relational observables and their construction. We discuss what the theory says about the fate of the big bang singularity at the beginning of our universe and how it suggests a quantum gravity origin for dark energy.