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### **Live Talk 4: Steinmann Relations, Causality and the Wavefunction of the Universe [Paolo Benincasa]**

*Tuesday 8 September 2020 16:00 (1 hour)*

Abstract: How consistent causal time evolution is encoded in the late time wavefunctions of the universe or correlation functions? This is one of the open questions which is crucial for our understanding of the fundamental physics encoded in quantum mechanical observables in cosmology. In this talk I will report on a recent progress in addressing such a question showing how the wavefunction of the universe, with an ab-initio description given by the cosmological polytopes, has to satisfy the so-called Steinmann relations, which in the flat space case are an avatar of causality. I will show that the Steinmann relations for both the S-matrix and the wavefunction of the universe arise via the same mechanism and rely on the intrinsic definition of the cosmological polytopes themselves. Finally, such relations constitute further constraints which can be used in the bootstrap program.