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Evolution of Universes in Causal Set Cosmology

Friday, 12 January 2018 09:40 (20 minutes)

The causal set approach to quantum gravity postulates that spacetime is fundamentally discrete. In this formalism spacetime is a causal set and each element in the set is a “spacetime atom” —a “here and now”, like a click of the fingers. The causal set spacetime grows through a stochastic process in which new elements are born into the set. We experience this birth process as the passage of time: the elements which are being born are the present, the elements that were born are the past, and the future has not yet come into being.

Classical Sequential Growth (CSG) models (arXiv:gr-qc/9904062) are a class of physically motivated models for such spacetime growth. This talk will begin with an introduction to CSG models and the cosmologies they give rise to, and continue with a discussion of causal set models of spacetime singularities and how a renormalisation of dynamical parameters occurs in a CSG model over such structures (arXiv:1703.07556). We will conclude by speculating how this could realise aspects of evolutionary cosmologies (suggested by J.A. Wheeler and others) in which the parameters of nature are reprocessed as the universe ages.

What would be the preferred length of your talk?

20 minutes + questions

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