

General Relativity and Quantum Cosmology

Encoding cosmological futures with conformal structures

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Quiescent cosmology and the Weyl curvature hypothesis possess a mathematical framework, namely the definition of an Isotropic Singularity, but only for the initial state of the universe. A complementary framework is necessary to also encode appropriate cosmological futures. In order to devise a new framework we analyse the relation between regular conformal structures and (an)isotropy, the behaviour and role of a monotonic conformal factor which is a function of cosmic time, as well as four example cosmologies for further guidance. Finally, we present our new definitions of an Anisotropic Future Endless Universe and an Anisotropic Future Singularity which offer a promising realisation for the new framework. Their irregular, degenerate conformal structures differ significantly from those of the Isotropic Singularity. The combination of the three definitions together could then provide the first complete formalisation of the quiescent cosmology concept. For completeness we also present the new definitions of an Isotropic Future Singularity and a Future Isotropic Universe. The relation to other approaches, in particular to the somewhat dual dynamical systems approach, and other asymptotic scenarios is briefly discussed.

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