

Abstract Submitted  
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**The Early Universe: Information Dynamics and the Structure of Time** WILLIAM BURDETT — The evolving concept of time has marked the progress of physics from the Newtonian framework through relativistic revisions and the quantum revolution. It has also vexed and challenged theoretical model building as time proved difficult to define in a consistent manner. Why is time readily reversible in simple dynamical equations while there is an “arrow of time” in the behavior of complex systems? While the subjective experience of the passage of time cannot be set aside, the discipline of physics must invest the concept of time with measurable substance to build successful explanatory models. The author contends that functional information as a measure of system complexity can fulfill this task [For example, see Hazen RM, Griffin PL, Carothers JM, and Szostak JW (2007) Proc Natl Acad Sci USA104:8574–8581]. In the case of the early universe, the singular event was not the “beginning of time” but the partition of the universe into observer-dependent domains of accessible and inaccessible functional information. Information dynamics at the common domain boundary accounts for the “arrow of time” or natural time. Cyclical or ordinary time is confined to the accessible information domain.

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