

Modeling the Progression of Time as an Autocatalytic Reaction.

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In describing the dynamic nature of time, my current thinking is that time is not some “thing” that flows, rather time progresses because it is a kinetic reaction. Not only does this line of thinking provide a mechanism to distinguish between the flow of time and the progression of time, it also allows us to explore why events in time happen perpetually. By viewing time as a reaction that progresses, it gives us the ability to apply knowledge and concepts based on mechanisms for kinetic reactions from chemistry to explain the nature time in terms of reaction kinetics. In this view, the dynamics of spacetime involves events that are coming to be and then passing away analogous to the generation of products from reactants in a chemical reaction. Thus, in contrast to the notion in physics that time flows from *past to present to future*, when viewed like a kinetic reaction, the direction of time progresses from *future to present to past*. Moreover, similar to the progression of a chemical reaction in which the reactants interact and go on to form products, the interaction of “future time” events can be modeled as the becoming of “now time” events that progress to “past time” events. That time progresses because of the interaction of future time events at a given frame of reference, lets us understand how the progression of time and its asymmetric direction occur as a spontaneous reaction based on reasoning from transition state theory (TST). This theory has been used for nearly 100 years to understand mechanisms of molecular reactions. In TST, the interaction of the reactants leads to formation of an instantaneously activated complex during a transition state in the progression to products. Notably, TST also assumes that a quasi-equilibrium exists between the reactants and the activated transition state. The reaction products are then irreversibly formed from the transition state. By applying TST to explain progression of events in spacetime, we can begin to understand the thermodynamics (energy & entropy) in the transition of future time events to past time events. Accordingly, a mathematical model was created for the kinetics of spacetime events whereby an activated transition state occurs as a now time event in the progression of future time events to past time events. In this way, the present (time now) is considered to be an instantaneous transition state in the progression of future to past. Additionally, based on TST, a quasi-equilibrium exists between future time events and now time events that establishes a superposition-like state whereby time fluctuates forward and backward between future time and now time. From the transition state, the now time events can (based on the activation energy) irreversibly progress to past time events. Moreover, TST provides a mechanism-based approach to understand why the progression of time might be perpetual. In my model for the progression of time, the model mechanism involves the interaction of past time events with time now events, which catalyzes the production of past time events. That is, past time events catalyze their own production. In chemistry, a reaction is autocatalytic if one of the reaction products is also a catalyst for the same reaction. In this view, the autocatalytic production of past time events may provide a mechanism that explains why the progression of time is perpetual and self-sustaining. Moreover, if time events are quantized or granular in nature, an autocatalytic mechanism (whereby past time events catalyze their own kinetic reaction) may function like a Swiss watch’s “escapement” mechanism that controls the asymmetric progression of time at the quantum level.