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DYNAMIC KINETIC STABILITY: TOWARD THE PHYSICALIZATION OF BIOLOGY

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ABSTRACT

Despite the dramatic advances over recent decades in uncovering the physico-chemical basis for life processes, the conceptual gap separating the physical and biological sciences continues to perplex. Life phenomena remain awkwardly incompatible with an accepted physical perspective on material behavior. In this talk I will describe the recent discovery of a previously unrecognized kinetic dimension in chemical space, one offering new insights into the life phenomenon seemingly unavailable through traditional thermodynamic considerations. The kinetic dimension encompasses stable, energy-fueled, non-equilibrium, dynamic chemical systems expressing a distinct stability kind termed dynamic kinetic stability. Recognition of such a stability kind offers physical insights into life's highly organized non-equilibrium structures and opens up possible strategies for the synthesis of simple proto-life systems. The conceptual gap that has long divided the physical and biological sciences may (hopefully) be beginning to narrow.

Keywords: dynamic kinetic stability, chemistry, life, physical science, biological science

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