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The Role of Fluctuations in Enzymatic Activity

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In "What is Life", a set of lectures delivered in 1944, Erwin Schrodinger states "... from all we have learnt about the structure of living matter, we must be prepared to find it working in a manner that **cannot** be reduced to the ordinary laws of physics [not because] there is any 'new force', ... but because the construction is different from anything we have yet tested in the physical laboratory." I will briefly discuss how this prediction fared 60 years after these lectures were given. With the advent of molecular, structural and single molecule biology, we are developing an increasingly mechanistic understanding of bio-molecular systems. The molecular machinery of life is imbedded in a viscous fluid where friction and thermal fluctuations are huge. In particular, studies of RNA enzymes such as the ribosome and other ribozymes show that their construction and operation *is* different than human designed machines that work in an environment where fluctuations and dissipation or minimized.