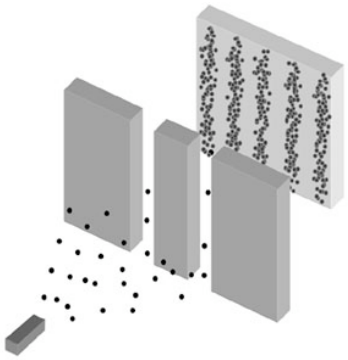
Physics Department Seminar

Friday April 25th, 2008

11:00am in PhSc 108

"Decoherence and the Emergence of the Classical World"



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Abstract:

At the beginning of the 20th century, it was apparent that light could no longer be considered just a wave. Thanks to the contributions of Planck and Einstein, it was shown that light also demonstrated the particle behavior that Newton was so thoroughly convinced of nearly 300 years earlier. DeBroglie, convinced of an underlying symmetry between matter and light, hypothesized that matter also had a wave-particle duality. This hypothesis was later experimentally verified via the interference pattern created by electrons in the Double Slit Experiment. Through the works of many brilliant physicists, the Theory of the Quanta has been fully worked out and has to this day, been celebrated as the most accurate theory ever conceived. In addition to correctly describing the behavior of blackbody radiation and atomic spectra, it has predicted the existence of the laser, the transistor and the unlocked power within in the nucleus. There is however one glaring problem with the theory: If Quantum Mechanics is indeed an accurate foundation for modeling the Universe, why does it not apply to the macro-world? This seminar will focus on the idea of Decoherence and how it solves this problem while still adhering to Quantum Theory.