



QUANTUM REALITY

ICTS PUBLIC LECTURE BY SANKAR DAS SARMA

Quantum mechanics, the underlying microscopic theory of our existence governing the behavior of the physical world, is the crowning success of human intellect. It is astonishingly successful – no experiment contradicts the predictions of the theory, and the theory has been explicitly verified to be correct to a precision better than 1 part in a trillion. In the past 60 years, developments of quantum theory have led to the modern technology that has revolutionized the world through applications such as transistors, lasers, integrated circuits, and magnetic discs. Despite this great success we really do not understand the quantum theory in an intuitive manner because quantum laws are so radically different from the classical laws of physics. The dichotomy that the modern world is quantum, but the precise meaning of the quantum remains elusive, disturbed the stalwarts of physics such as Einstein, Schrodinger, and Feynman, and continues to baffle physicists even today. This lecture will explore this curious state of affairs, highlighting the numerous quantum based ideas and applications which underpin our modern world and the sublime strangeness of the theory which completely eludes our intuition. Connection will be made to some of the most exciting recent developments such as quantum computation which is bridging the gap between the 'weird' microscopic laws of the quantum world and some real life problems in our everyday world such as code breaking and database search.

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