

An Introduction to the Most Important Current Scientific Theory-Quantum Mechanics

The theory known as quantum mechanics underlies everything that we know about in the universe. It explain the nature of matter and light at its most fundamental levels. But it is also the basis of most of modern technology such as electronics, computers, lasers, MRI scanning and much more.

In addition the theory features many bizarre philosophical claims which have entered the popular imagination and have often been misrepresented in popular accounts. The theory is usually considered difficult and some of its aspects are indeed very complex. But it is also possible for lay-persons to grasp the essential ideas provided that a clear and appropriate explanation is provided by the presenter.

I have been teaching the basics of quantum mechanics to beginning undergraduate students for about 30 years, as well as to lay audiences. I have taught primarily in chemistry departments and for the past 15 years have been a full-time lecturer at UCLA, regularly teaching large classes. I have also written a number of popular books on the relationship between chemistry and quantum mechanics.

Although the theory originated in physics, it is paradoxically used to a greater extent by research chemists and students of chemistry. In physics it is regarded as something of an exotic topic which students are only exposed to in a highly mathematical fashion in their later years. In chemistry it turns out that quantum mechanics forms the basis for understanding the nature of atoms and molecules and how they bond and react together. This is why chemists receive more exposure to quantum mechanics, often in a less mathematical but more conceptual way that lends itself more readily to popularization to a wider audience.