

An Approach to the Realistic Explanation of Quantum Mechanics.

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In the late 1920's and early 1930's, many physicists felt that the phenomenological quality of quantum mechanics was a temporary difficulty, which would soon disappear. Scientists of profound insight, such as EINSTEIN, SCHRÖDINGER and DE BROGLIE felt convinced, even in the 1950's, that physics would have to return someday to the concept of an external world existing in a definite (if unobserved) state and to the concept of observers obeying the same laws as the observed ones. EINSTEIN could accept strongly the philosophical notion of a meaningful God existing, but not the notion that there is no external universe at all, or, even worse, the notion of phenomenology. The sheer complexity of quantum mechanics, in Fock space, was enough to persuade most physicists of the value of trying to «explain» it, a few decades back.

In the meantime, the structure of quantum mechanics has grown more and more complex. We are reminded of medieval astronomy; the direct idea of the Sun and stars revolving about the Earth seemed simple enough, to begin with: phenomenal appearances seemed to be a «natural» basis for astronomy. But, as new facts accumulated, the phenomenological approach grew hopelessly complex, and left us with little capacity, *either* mathematical or intuitive, for coming to grips with new data. Nowadays, as hundreds of unexplained particles show up all across the spectrum, and as the quantum formalism has not found a solid mathematical base in any area but that of electrodynamics, the analogy grows stronger and stronger. The philosophical objections to phenomenology are just as compelling now as in 1930; the physical limitations of quantum mechanics are far clearer than they were in the time of EINSTEIN; therefore physicists should, in principle, be *more* interested now in realistic explanations than ever before. Yet in the United States, the idea of explaining quantum mechanics in realistic terms has become extremely unpopular.

There is one and only one justification for this change in attitudes: the experience of many physicists, *trying* to construct a realistic explanation of quantum mechanics, *unable* to get anywhere; if one begins to believe that a real explanation has a low probability of ever being found, then one logically attributes a low probability that such an explanation would ever be found true. If such an explanation should again seem possible, however, logic would demand that we attribute a high probability of truth to this explanation.

