

7. The Stochastic Process Interpretation: This is the point of view which holds that fundamental processes of nature are stochastic (i.e., probabilistic) processes; ~~independently of any acts of observations~~. According to this picture physical systems are at continually undergoing probabilistic changes of state, independently of any observers. All times ~~objectively~~ change all times supposed to exist in definite states, but ~~the~~ the states are ~~change~~ continually undergoing ~~and~~ probabilistic changes. The discontinuous probabilistic "quantum jumps" are not associated with acts of observation, but are fundamental to the systems themselves.

^{stochastic} ~~apparently~~ investigated
Such a theory has been carried out by Bopp.
In this theory the fundamental entity is taken to be the particle, not wave. This theory emphasizes the particle aspects in distinction to the wave aspects of quantum theory. The particles do not, ~~but~~, obey deterministic laws of motion, but rather probabilistic laws, which are referred to as "correlation statistics." By developing a general "correlation statistics," Bopp shows that his quantum scheme is a special case which gives results in accord with the usual theory. (This accord is only approximate, however, but to an extremely high degree of approximation. In principle one could decide between Bopp's theory and the usual theory. The approximation is so close, however, that it is hardly conceivable that a distinction could be made in practice. A decision would be practically feasible.)

Doppi's theory seems to stem from a desire to ~~explaining the~~ have a theory founded upon particles rather than waves, since it is this particle aspect (highly localized phenomena) which is most often encountered in ~~experiments~~ present day high-energy experiments (cloud chamber tracks, etc.). However, it seems to us to be much easier to understand particle aspects from a wave picture (concentrated wave packets) than it is to understand wave aspects (diffraction, interference, etc.) from a particle picture.

Nevertheless, there can be no fundamental objection (except perhaps on purely philosophical grounds) to ~~this~~^{stochastic} probabilistic theories, except on grounds of a naked prejudice for deterministic theories. This is obviously forever undecidable in physics.

The objection to having prob. based only on acts of observation is another matter.

It is quite another matter to object to a mixture of the two where the probabilistic processes
aspects depend upon acts of observation.
or dependent upon acts of observation.

The matter is forever undecidable.

Since for any current deterministic [probabilistic] theory one could always postulate & refine that a refinement of the theory would disclose a probabilistic [deterministic] sub-structure, and that the current deterministic [prob] theory is to be explained in terms of the ^{refined} new theory on the basis of the law of large numbers [hidden variables]