

mental construct making it possible to calculate certain probabilities; but in order to do that, it must be chosen by the person employing it, providing his data are accurate, proportional to the v function according to the formula $\Psi = Cv$.

The normalization constant C must be chosen accordingly and may vary sharply, depending upon the data that the user accumulates regarding the localization of the particle. That is the way one can account for the singular fact that, in the usual explanations, the Ψ function sometimes appears as a concrete and objective reality determining the particle's behavior and localizations, and even, if need be, the stationary states and quantized values of its energy, and at other times, as a normalizable representation of probabilities of a purely subjective character. In the theory of the double solution, it is the wave function v , the regular exterior portion of the u wave, that is definitely concrete and objective and that determines the localizations and quantized stationary states of the particle; the Ψ function is here regarded merely as a subjective representation of probabilities as a result. But—and this is the crucial point—the Ψ function, when constructed by its user according to accurate data, must be proportional to the v function, and that is the circumstance that makes it difficult to distinguish clearly between v and Ψ and that creates frequent confusions.

The explanation of the theory of the double solution given in this section is very sketchy; the reader who wishes to go into its basic concepts more thoroughly should consult fuller explanations of it*. Without stopping to consider any further the difficult problems posed by the development of these new concepts—problems that are far from being entirely solved at the present time—I should now like to speak of an important idea that developed quite naturally in this concrete interpretation of wave mechanics.

2. THE SUBQUANTIC MEDIUM OF BOHM-VIGIER

The development of atomic and nuclear physics during the past eighty years or so has led to the discovery, below the 'macroscopic' level accessible to direct observation, of a deeper level of physical reality, the 'microphysical' or 'quantized' level where we find material and light particles involving quanta and quantized states. But might there not exist, hidden from our direct observations and even below the 'microphysical' level that we have discovered and explored for hardly more than a half a century, an even more fundamental level? In the course of the development of quantum physics,

* See Bibliography [5].