

### III - Quantum Mechanics

Having formulated the ideas of information and correlation for probability distributions, we turn to the field of quantum mechanics. In this chapter we assume that ~~physical~~ <sup>mathematically</sup> the states of physical systems are represented by points in a Hilbert space, and that the time dependence of the state of an isolated system is governed by a linear wave equation. A fact of great importance to our interpretation is that the ~~state function of a composite system~~

State function lead, in a well known manner, to distributions over eigenvalues of Hermitian operators (square amplitudes of expansion coeff. of the state in terms of the basis consisting of eigenfunctions of the operator) which can be interpreted as probability distributions. These have the mathematical properties of probability distributions (non-negative and normalized). The standard interpretation of Quantum mechanics regards these distributions as actually giving the probabilities that the various eigenvalues of the operator will be observed, when measurement represented by the operator is performed.

A feature of great importance to our interpretation is the fact that a state function of a composite system leads to joint distributions over subsystem quantities, rather than independent subsystem distributions -- i.e., the quantities in different subsystems may be correlated with one another. The first section of this chapter is accordingly devoted to the development