

## Properties and their Relation to Measurement

Now that we have examined many YAIs of quantum mechanics, of which none seriously addresses the measurement problem as we have defined it, we will turn to the examination of theories that do propose a physical rationale for the occurrence of measurement. Before this is done, there are several properties of measurement that are common to any new theory that attempts to go beyond standard quantum mechanics. When the measurement problem has been fully resolved, it is conceivable that there will be a substantial number of new properties that are related to a measurement process. However, at present there are at least the following properties that are often associated with measurement: quantum jumps, wave function reduction, nondeterminism, irreversibility and entropy, loss of coherence, amplification, localization, particle absorption, and the Zeno effect.

When an interaction-free or negative measurement occurs, a particle is not absorbed and the measurement device does not register a detection. As has been discussed, in the von Neumann theory of quantum mechanics, the measurement postulate is invoked even in the case of IFM. On the other hand, when a measurement device does register a detection, it is generally due to the presence of a particle that the device is designed to detect. In order to discern negative measurement from the case when a device registers a detection, the latter will be referred to as *positive measurement*.