

Particle Absorption

Positive measurement generally is often associated with the absorption of a particle into the detector. On the other hand, there are measurement techniques such as non-demolition measurement (see Chapter 7) in which information is gained regarding a particle state for which the particle is not demolished or absorbed into the detector. However, it is conceivable that other particles are absorbed into the detector in non-demolition measurement. Hence it appears to be reasonable to consider whether or not absorption is a necessary and/or sufficient condition for measurement.

Discerning Particle Absorption

In the discussion of the Transactional Interpretation, it was concluded that photon absorption is not a sufficient condition for measurement, due to the experimental evidence in cavity QED experiments for which such interaction is confirmed to be unitary. In the unitary case, there exists an evolution time when a photon interacting with an atom in a cavity will be 100% in the state for which the atom has absorbed the photon, assuming the interaction is on-resonance.

On the other hand, one might ask if absorption is a necessary condition for measurement. Suppose that it is found that measurement devices exist that emit a particle in the process of measurement. Such a case has been considered in [201, p. 612] via stimulated emission. If such devices were found to exist, then absorption of the incoming photon would not be a necessary condition for its measurement. Particle absorption is not a sufficient condition and may or may not be a necessary condition.