

Weak Measurement

Weak measurement, as developed by Aharonov et al. [672, p. 233], is actually a unitary operation for which systems weakly interact assuming the measurement-system unitary coupling formalism considered by von Neumann [13, pp. 441-445] in concert with a pre-selected state and post-selected state. The post-selected state occurs via bona fide measurement. Weak measurement and the weak values that result have been used to analyze and shed light on a number of quantum phenomenon.

It is claimed in an experiment in [673] that Heisenberg's uncertainty can be violated by weak measurement. Further analysis however indicates that the latter experiment still conforms with the spirit of Heisenberg's principle via error measures that are quantified by distances between observables [674].

In any case, other than the possibilities of pre and post selection, the intervening weak interaction is unitary and not a measurement operation.