

# Explaining Duality without Complementarity or “which way” (welcher-weg) And also Retro-Causality and Non-Locality

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## Abstract

An Axiom is presented and justified which (a) *Explains duality in interference without complementarity or “which way” (welcher-weg) observation* (b) Shows the equivalence: Coherence and alignment  $\equiv$  Interference  $\equiv$  No “which way” observation; No coherence or alignment  $\equiv$  No interference  $\equiv$  “which way” observation (c) Explains Wheeler’s delayed choice thought experiment (d) Explains results of experimental implementations of Wheeler’s experiment which show retro-causality with and without entanglement (e) Explains non-local action at a distance, and (f) Rephrases Albert Einstein’s unanswered question “Is quantum mechanics complete?” at a more fundamental level than just duality and non-locality. The explanation given does not require that the particle (photon) somehow “know” about the test setup or “which way” observation or change its behavior from particle to wave and vice versa as required by currently accepted explanation based on Niels Bohr’s complementarity principle. No new assumptions are made, only *a new complete interpretation* of probability which is already a fundamental assumption of quantum mechanics.