

*Run the double-slit experiment one photon at a time, but put detectors at both slits so you can measure a photon going through the left slit, the right slit, or both simultaneously.*

You might guess that each photon will set off both detectors, since we said that each photon passes through both slits. But that isn't what happens. Each time a photon passes Wall A only one of the two detectors goes off. Even more interestingly, we no longer see alternating bands on Wall B!

Recall that, according to the orthodox interpretation, any measurement causes the collapse of the wavefunction. Once we measure a photon going through either slit, that photon is now going through that slit exclusively—its wavefunction is not spread out through space—so there is no interference.