

Abstract Submitted
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Delayed Choice in Feynman's Neutron Scattering off a Crystal Experiment: The Effect of Information on the Neutron Distribution - 2 DOUGLAS SNYDER, None — Feynman (Lect. on Phys., v. 3, 1965, p. 3-7) maintained in his neutron scattering off a crystal experiment that which-way information can exist even if one does not perform a measurement. This interaction can involve a spin flip for both the neutron and nucleus that the neutron scatters off. With the flip, the spin of the nucleus that the neutron scattered off becomes different than the spin direction of the other nuclei in the crystal that the neutron could have scattered off. The spins of the other nuclei are the same. It may be possible to eliminate the ww information as long as particle detections have not been made. Through spin-lattice relaxation after the neutron-nucleus interaction occurs, the spin flip of the nucleus would reverse before any detection is made. The result is interference in the neutron distribution. Altering relaxation duration relative to neutron detection time could provide a delayed choice. Another possibility for a delayed choice would be to shut off the uniform, strong, external magnetic field B that initially aligns all of the spins of the crystal nuclei along the same axis. To eliminate the possibility that the spin flip in the neutron could be a factor in the neutron distribution, one could “mix up” the neutron spin orientations along the axis of B by extending B past the crystal almost to the neutron detector. Apply low intensity pulsed oscillating magnetic radiation (B') to the neutrons in the area between the crystal and the neutron detector (at the neutron Larmor precession frequency) at a 90° angle to the axis of the B field. It can flip neutrons from a low energy state to a high energy state or vice versa.

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None

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