Abstract Submitted
for the APR14 Meeting of
The American Physical Society

The Reduced Density Matrix is Not Applicable to Entangled Particles Where the States of One of the Particles Relevant to the Entanglement are Eliminated before Any Detections are Made DOUGLAS SNYDER, None — The applicability of the reduced density matrix is shown to depend on the existence of the states of both of two entangled particles even though the probabilities of the specific states of one of the particles are not known or ignored (traced out). The reduced density matrix is shown theoretically not to be applicable to where the states of one of two entangled particles relevant to the entanglement of the particles are eliminated before any particle detections are made, specifically in the case where the eliminated states had provided which way information to the other particle. In contrast, Cantrell and Scully wrote concerning the use of the reduced density matrix with entangled particles, specifically in EPR: "If at any time we are asking only about a part (e.g., spin 2 only) of our entire system (e.g., spin 1 and 2 of two entangled particles taken together), we must characterize our system by a reduced density matrix" (p. 504; Cantrell, C.D. and Scully, M.O. 1978. Physics Reports, 43: 499-508). An experiment is proposed that would test the hypothesis through a delayed choice on the particle whose states relevant to the entanglement can be eliminated, the delayed choice being whether to eliminate these states. If the hypothesis is correct, different distributions (interference or which-way) of the other particle are obtained depending on the delayed choice that is made.

Douglas Snyder
None

Date submitted: 25 Dec 2013 Electronic form version 1.4