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Proposed Experiment to Test Local Hidden-Variable Theories. J. F. Clauser, Columbia University.-- Bell has shown[1] that for Bohm and Aharonov's formulation of the Einstein, Podolsky, Rosen paradox[2] the correlation function for distant spin measurements in a local hidden-variable theory cannot equal the quantum mechanical prediction. It is shown in the present paper that of the two experiments which "test" the EPR quantum mechanical predictions [3,4] neither has so far provided a test for the existance of local hidden-variables.

The measurement of the polarization correlation of annihilation gamma-rays with Compton polarimeters[4] has a correlation which cannot violate Bell's inequality and hence cannot rule out such theories.

The measurement of the polarization correlation of photons emitted in an atomic cascade[4] could have provided such a test had it been performed at angles between 0° and 90°, which it was not. Additional extensions of this experiment are proposed. Such an experiment must then rule out all local-hidden-variable theories governing the polarization of photons or disprove the Copenhagen interpretation and predictions of quantum theory.

[1]J.S. Bell, Physics 1,195(1964)
[2]D. Bohm & Y. Aharonov, Phys.Rev.108,1070(1957)
[3]C.S. Wu & I. Shaknov, Phys.Rev.77,136(1950)
[4]C.A. Kocher & E.D. Commins. Phys.Rev.Letts.15,575(1967)

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