Proposed Experiment to Test Local Hidden-Variable Theories. J. F. Clauser, Columbia University.-- Bell has shown\(^1\) that for Bohm and Aharonov\(^2\)'s formulation of the Einstein, Podolsky, Rosen paradox\(^3\) 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 existence 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 could have provided such a test had it been performed at angles between 0\(^\circ\) and 90\(^\circ\), 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)
\(^{3}\)C.S. Wu & I. Shaknov, Phys.Rev.77,136(1950)

Submitted by

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