On The Correlations Of Polarizations In The System Of Two Photons

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Correlations of the linear and circular polarizations of two photons have been theoretically investigated. The structure of the polarization density matrix of two photons is discussed. The polarization of a two-photon state is described by the one-photon Stokes parameters and by the components of the correlation "tensor" in the Stokes space. It is shown that the correlations between the Stokes parameters in the case of the two-photon decays $\pi^0 \to 2\gamma$, $\eta \to 2\gamma$, $K_L^0 \to 2\gamma$, $K_S^0 \to 2\gamma$ and the cascade process $|0\rangle \to |1\rangle + \gamma \to |0\rangle + 2\gamma$ ($|0\rangle$ and $|1\rangle$ are states with the spin 0 and 1, respectively) have the purely quantum character: the incoherence inequalities of the Bell type for the components of the correlation "tensor", established previously for the case of classical mixtures, are violated. The general analysis of the registration procedure for the system of two correlated photons by two one-photon detectors is performed.