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On the correlations of polarizations in the system of two photons produced in hadronic decays

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The theoretical study of correlations of the linear
and circular polarizations in the system of two photons has been performed. 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 (i.e. there is always one case when the modulus of sum of two diagonal components of the correlation “tensor” exceeds unity). The general analysis of the registration procedure for the system of two
correlated photons by two one-photon detectors is performed.

Primary author: Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research, Dubna)

Co-author: Dr LYUBOSHITZ, Vladimir (Joint Institute for Nuclear Research, Dubna)

Presenter: Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research, Dubna)

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