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Investigation of decoherence of annihilation quanta

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Recently, different groups have performed measurement of polarization correlations of annihilation quanta after inducing decoherence of one of the gammas by Compton scattering yielding somewhat contradictory results. Watts et al. [Nat. Commun., 12, 2646, (2021)] reported the result hinting at loss of correlation, while Abdurashitov et. al. [Jour. Inst. 17, P03010, (2022)] reported strong correlation at least at small scattering angles. We have used the setup based on Single Layer Gamma Ray Polarimeters to measure the correlation of annihilation quanta after an intermediate Compton scattering under angles ranging from 0 to 50 degree, thus significantly extending the range compared to previous measurements. The results of these investigations will be presented.

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