

# Setup to study the Compton scattering of entangled annihilation photons

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In this contribution, the Compton scattering of entangled annihilation photons is discussed. The pairs of gammas with energy 511 keV are born in electron-positron annihilation and have the entangled polarization states. Since the Compton scattering depends on the polarization of the initial photon, one can expect to observe the peculiar properties of the Compton scattering of entangled gammas. The scattering kinematics of entangled and decoherent photons with different polarization states might be quite different.

To test the difference in the kinematics of Compton scattering of photons in entangled and decoherent states the dedicated experimental setup is now under construction at INR RAS. This setup has two arms, each containing plastic scatterer and 16 NaI(Tl) scintillator counters with PMT readout that arrange 16 dichromatic Compton polarimeters. An additional small scatterer of GAGG scintillator with SiPM readout is placed in one arm to produce the pairs of decoherent photons.

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