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## Testing CPT symmetry in ortho-positronium decays with J-PET detector

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Search for possible violation of combined charge, parity, and time-reversal symmetries is yet another approach for a test of New Physics, therefore a bound state of electron and positron (positronium) as the lightest matter-antimatter system and at the same time an eigenstate of the C and P operators is a unique probe in such endeavour. The test is performed by measurement of angular correlations in the annihilations of the lightest leptonic bound system. With the Jagiellonian Positron Emission Tomograph (J-PET) we have collected an unprecedented range of kinematical configurations of exclusively-recorded annihilations of the positronium triplet state (ortho-positronium) into three photons. Employing a novel technique for estimation of positronium spin axis on the basis of a single event, we determined the complete distribution of an angular correlation between spin and annihilation plane of ortho-positronium. We present recently published result of determined expectation value of this correlation at the precision level of  $10^{-4}$ , with an over three-fold improvement on the previous measurement. We discuss also the prospects for reaching the precision level of  $10^{-5}$  with the CPT symmetry test at the J-PET detector.

### In-person participation

No

**Primary authors:** Dr CZERWIŃSKI, Eryk (Institute of Physics, Jagiellonian University); GAJOS, Aleksander (Jagiellonian University, Krakow, Poland)

**Presenter:** GAJOS, Aleksander (Jagiellonian University, Krakow, Poland)

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