



KONWERSATORIUM INSTYTUTU FIZYKI UMCS

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Prof. dr hab. Paweł Moskal

Wydział Fizyki, Astronomii i Informatyki Stosowanej,
Uniwersytet Jagielloński, Kraków

First positronium imaging of the human brain using a multi-photon J-PET scanner

The Jagiellonian Positron Emission Tomograph (J-PET) is the first multi-photon PET scanner capable of measuring momentum vectors and polarization of photons originating from the decays of positronium.

J-PET enables imaging of positronium properties in living organisms, the study of discrete symmetries in positronium decays, and studies of the degree of quantum entanglement of photons from electron-positron annihilations.

We will present the first-ever images of the properties of positronium in humans [1,2,3], the most accurate results to date of P, T, CP, and CPT symmetry tests in the decays of positronium atoms [4,5], and the first observation of non-maximal entanglement of photons from positronium annihilation in matter [6].

[1] P. Moskal et al., Nature Reviews Physics 1, 527 (2019).

[2] P. Moskal et al., Science Advances 7, eabh4394 (2021).

[3] P. Moskal et al., Science Advances 10, eadp2890 (2024).

[4] P. Moskal et al., Nature Communication 12, 5658 (2021).

[5] P. Moskal et al., Nature Communication 15, 79 (2024).

[6] P. Moskal et al., [arXiv:2407.08574](https://arxiv.org/abs/2407.08574), Science Advances, in review.

Uprzejmie zapraszam wszystkich pracowników, doktorantów i studentów Instytutu Fizyki.

Prof. dr hab. Ryszard Zdyb
Dyrektor IF UMCS