



Pawel Moskal

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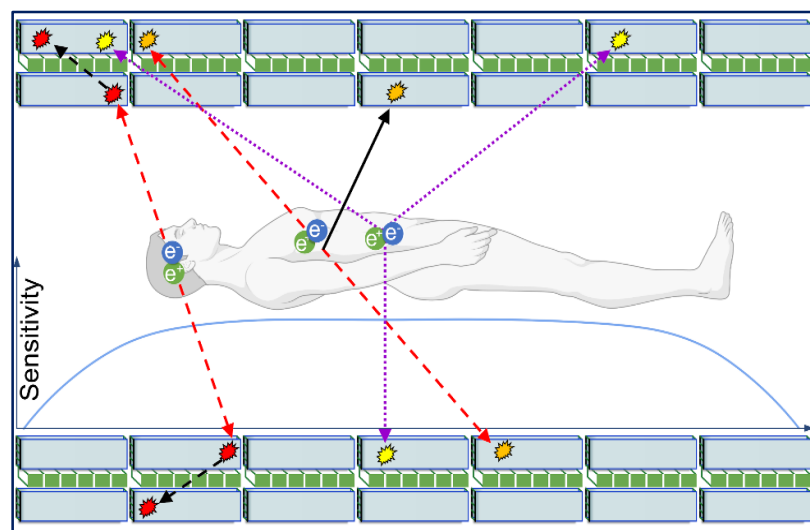
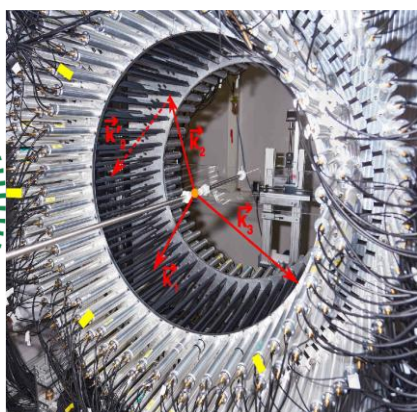
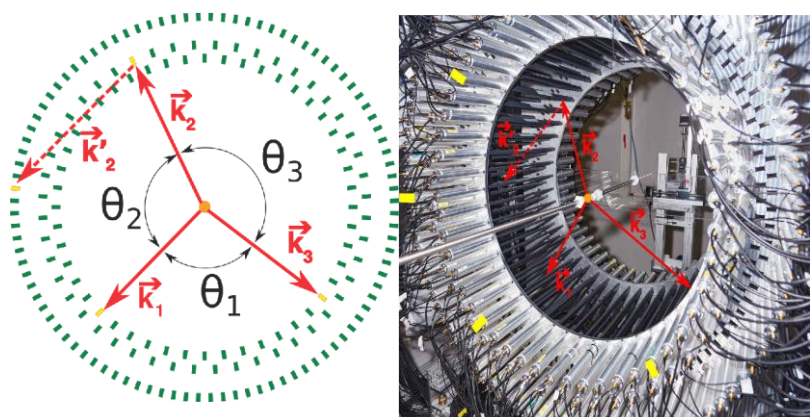
Public Lecture

Homi Bhabha Auditorium, TIFR, Mumbai

March 10, 2025 at 5:00 PM

Recent Advances in Gamma-ray Imaging (Fundamentals to Applications)

The detection of gamma rays is fundamental to research in nuclear and particle physics, as well as to diagnostics in nuclear medicine. This lecture will begin with a discussion of the basic principles of gamma-ray detection. We will then present the latest advancements in diagnostic imaging used in nuclear medicine, including a description of the Jagiellonian Positron Emission Tomograph (J-PET). The J-PET is the first multi-gamma-ray PET scanner capable of measuring the momentum and polarization vectors of gamma rays originating from positronium decay and the de-excitation of excited radionuclides. Multi-gamma-ray detection enables imaging of positronium properties in living organisms, the study of matter-antimatter symmetries, and the investigation of the degree of quantum entanglement of photons from electron-positron annihilation. We will present the first-ever clinical images of positronium properties in humans, and the first observation of non-maximal entanglement of photons from positronium annihilation in matter.



<https://koza.if.uj.edu.pl/>

Professor Pawel Moskal is the head of the Cluster of Nuclear Physics Department and the head of the Department of Particle Physics and Applications at the Jagiellonian University in Cracow, Poland. He is also a co-founder of Center for Theragnostic, which is a flagship project of the Jagiellonian University. He is an inventor of cost-effective positron emission tomography. He conceived and headed a medical experiment demonstrating the first positronium images of the human brain in vivo. He has been awarded many prizes including the Prime Minister Medal for Merit for Invention, Minister of Education and Science Award, Minister of Science and Higher Education Award.