

A seminar "Between Physics and Biology and Medicine"

Department of Medical Physics and Department of Experimental Particle Physics and Applications Institute of Physics M. Smoluchowski of the Jagiellonian University

„Development of next generation of brain-PET (BRAIN PET EXPLORER)“

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Brain-PET has the potential to play an important role in the early diagnosis, clinical workup and research on brain diseases and mental illnesses including Alzheimer's, providing that quantitative imaging performance of brain-PET could be improved. For this purpose, we are developing advanced detector modules, readout electronics and associated algorithms, leveraging in particular recent progress in time-of-flight (TOF) detector technologies. These modules will lay the foundation for a follow-on project to develop an ultra-high-performance dedicated whole-brain TOF-PET camera (BRAIN PET EXPLORER) for research and clinical work. This device will overcome the current technology shortcomings by providing substantial gain in effective sensitivity and much higher spatial resolution imaging over the current most advanced brain-PET systems (e.g., NeuroEXPLORER). The crucial factors for improved performance of TOF-PET are better coincidence time resolution (CTR), better localization of the gamma-ray detection events, and higher gamma-ray detection efficiency.

About the Speaker:

Andrzej Krol received his PhD in solid-state physics from Warsaw University. Subsequently, he joined the faculty at the Physics Department at SUNY Buffalo. He then entered the field of medical imaging and currently is a Professor of Radiology at SUNY Upstate Medical University. His research is focused on molecular imaging devices (PET and SPECT) development, molecular image reconstruction for improved diagnostic imaging performance in PET, and theranostic application in oncology. He has a broad background in medical and imaging physics (both hardware and software). He has been involved in the creation of novel gamma-ray detectors for PET and soft x-ray detector, and the development of phase contrast micro-CT and ultrafast laser-based x-ray sources for angiography and mammography (US patent #6,980,625).



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