

Garching Maier-Leibnitz-Kolloquium

Donnerstag, 27.10.2022, 16¹⁵ Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

Dr. Reimund Bayerlein
(Univ. of California at Davis, USA)

EXPLORER - Opportunities and Challenges in Total-Body PET Imaging

Positron emission tomography (PET) is a powerful molecular imaging modality, promoting enhancements in research and clinical care. It is based on the coincident detection of pairs of 511 keV photons upon injection of a radioactive tracer into the patient. PET is a diagnostic tool and enables for instance the visualization of metabolic processes or the measurement of physiological activities like perfusion.

The sensitivity of conventional PET scanners is limited by the small axial field-of-view (AFOV) and full-body coverage is only possible through serial scans in multiple bed positions. This can be overcome by the uEXPLORER total-body PET/CT (computed tomography) scanner with an AFOV of 194 cm resulting in a 15-65 times higher sensitivity. This enables improved image quality, or reduced scan time, or reduced radioactivity and allows for total-body dynamic scanning and parametric imaging, where each image voxel represents not the activity concentration but some physiological parameter, such as glucose metabolic rate.

However, the large number of detectors and the widened acceptance angle dramatically increase the data sizes, setting higher demands on image reconstruction algorithms and computational power. Standard methods for count-rate dependent data correction methods are put to the test, and with the entire body in the FOV, motion correction becomes more important. Nevertheless, total-body PET scanning constitutes a ground-breaking tool to address open questions in biology and medicine and generates novel research projects for countless interdisciplinary fields. After a short introduction to the principles of PET imaging and a brief history of the uEXPLORER PET/CT scanner, this talk will provide an overview of challenges, current projects, and novel applications of total-body PET and its implications for the developments in the world of molecular imaging.

Hybrid online access via ZOOM:

<https://lmu-munich.zoom.us/j/98457332925?pwd=TWc3V1JkSHpyOTBPQVlMelhuNnZ1dz09>

Meeting ID: 984 5733 2925

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