FAKULTÄT für PHYSIK
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PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 19.07.2012, 16^{15} Uhr

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

Dr. Sergei Gasilov

LMU, Garching

Perspectives for phase contrast medical imaging of large samples: computer simulations for X-ray index of refraction tomography

Several X-ray phase contrast methods allow for a reconstruction of the index of refraction distribution even in strongly absorbing objects, which is of interest for medical imaging. Due to the complexity of the experiments, the reconstruction of the index of refraction in a large biological sample has not yet been demonstrated. Existing studies are limited to few-centimetre sized samples or very simple models. In order to extend these results, we have tested the potential sensitivity of the X-ray index of refraction tomography in full 3D numerical simulations of the phase contrast analyzer-based imaging on models of large clinical-like samples, e.g. human knee joints. Solutions of the inverse problem were obtained under a constraint on the possible delivered dose in the object. We will discuss how computer simulations were used to estimate the experimental parameters and configurations for the detection of index of refraction gradients in different objects. Additionally, we will present a model for the interpretation of the phase contrast signal from objects containing many sub-pixel size inhomogeneities.

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