**SP-0402 Uncertainties and warning with flattening filter free beams**

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**SYMPOSIUM: THE GENERATION OF NEW IMAGING MODALITIES: NEW PERSPECTIVES**

**SP-0403 The role of imaging in the fight against cancer**

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**SP-0404 Emerging possibilities with high field MRI**

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**SP-0405 Dual energy CT**

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**SP-0406**

**Emerging possibilities with high field MRI**

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**Magnetic resonance imaging (MRI) offers the potential for better tumour localisation, staging and monitoring therapy response compared to X-ray CT, due primarily to its inherently superior soft-tissue contrast resolution. However, problems persist with the exclusive use of conventional MRI techniques in therapy planning in many body areas, while technical factors (such as image geometric distortion and artefacts) also pose problems. As MRI technology continues to evolve, advances such as higher magnetic field strength systems, phased array detector coils allowing for fast image acquisitions, and multi-transmit technology, are improving the quality and robustness of several existing and novel MRI techniques, which will impact on radiotherapy planning and follow-up monitoring. In addition to conventional high resolution T1 / T2 weighted imaging, the functional techniques of diffusion weighted imaging (DWI), whole-body DWI, dynamic contrast enhanced (DCE), dynamic susceptibility contrast (DSC) and spectroscopic imaging have all benefited from the increased signal arising from high field MRI systems, while emerging techniques such as phosphorous spectroscopy and sodium imaging also show considerable potential. This talk will give a brief overview of MRI before delving into current high field MRI technology, explaining how these developments benefit both anatomical and functional MR imaging techniques.**

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**Individualized medicine requires techniques that enable visualisation, quantification and the series of disease processes in a non-invasive way in individual patients. Medical imaging is intuitively very suitable for this purpose. Over the past decades, medical imaging has progressed in four distinct ways allowing quantitative imaging: innovations in medical devices (hardware), innovations in imaging agents, standardisation in imaging protocols, and innovations in imaging analysis. By these we have witnessed medical imaging in clinical oncology evolving from a primarily diagnostic tool to a theragnostic tool by a multitude of techniques involved in the treatment and characterisation of tumours and normal organs and tissues. Radiation oncology relies heavily on imaging. Computed tomography (CT), positron emission tomography (PET), and magnetic resonance imaging (MRI) are routinely used, mainly for dose calculation (CT), and for treatment planning (PET and MRI). However, much more can be gained by incorporating functional and molecular imaging in the processes of radiation oncology. First, imaging can play a major role in identifying interpatient differences by assessing the tumour phenotype. An example of this is Radiomics, a research field where the imaging data is converted in minable data thereby quantifying the tumour phenotype. This information cannot only be used to select patient specific treatment, but also select for further imaging testing e.g. hyperemia imaging or drug uptake imaging. Secondly, imaging plays a role by assessing intra-tumour and intra-organ heterogeneity. Additional radiation dose must be delivered to those parts of the tumour that need it the most, e.g. because of increased biologic treatment resistance or reduced therapeutic drug uptake, and away from regions inside the lung that are most prone to complication. In this presentation we will focus on our work in these areas, on extracting more meaningful information from medical imaging, in the context of personalized medicine.**