BELGISCHE VERENIGING VOOR STRALINGSBESCHERMING

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ASSOCIATION BELGE DE RADIOPROTECTION

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Avenue Herrmann Debrouxlaan 40
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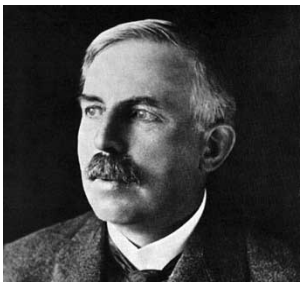
Secrétariat Véronique Mertens
c/o FANC/AFCN
rue Ravensteinstraat 36, 1000 Bruxelles

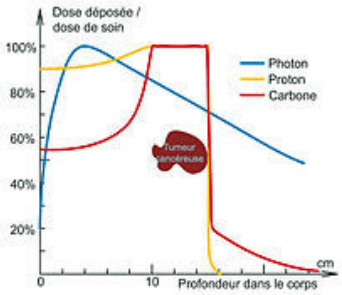
Scientific meeting

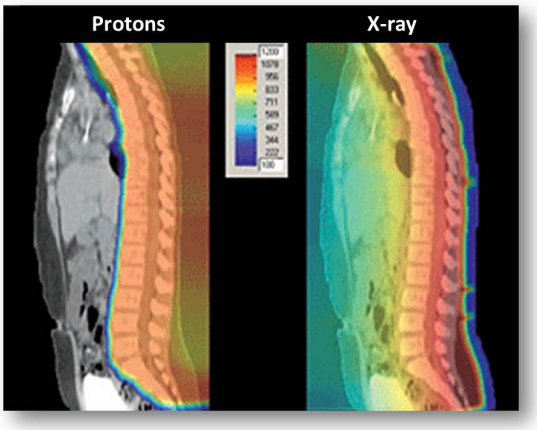
"Proton therapy – From the Need to the Solution"

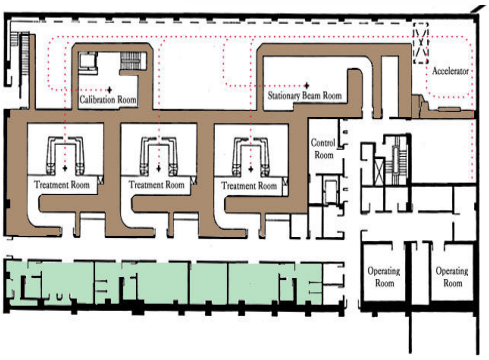
Friday June 23, 2017

FANC, Room 503 - 504
Rue Ravensteinstraat 36, 1000 Brussel









PROGRAMME

14.00-14.30 : Dr. Xavier Geets (Saint-Luc, UCL) : *" Protontherapy: a favourable ballistic that will benefit patients ?"*

14.30-15.00 : Prof. Dr. Ir. Tom Depuydt (UZ Gasthuisberg) : *"Proton Therapy Technology in the Clinic"*

15.00-15.15 : Coffee Break

15.15-15.45 : Dr. Sc. Wiel Kleeven (IBA) : *"Accelerator, Beamline and Gantry technology for IBA Proton Therapy Systems"*

15.45-16.15 : Dr. Ir. Steven Peetermans (Controlatom) : *"Overwegingen van stralingsbescherming voor protonentherapie : innovatieve invulling van een vertrouwd concept"*

16.15-16.45 : "Question time" – Conclusions

Pr Xavier Geets, M.D. Ph.D., Cliniques Universitaires Saint-Luc

Professor Xavier Geets has awarded a degree in Medicine in 2000 at the Université Catholique de Louvain, and was board certified in Radiation Oncology from the same university in 2007. After a 4 years' research in the Molecular Imaging, Radiotherapy and Oncology Lab, he got his PhD thesis on "adaptive biological image-guided radiation therapy in head and neck cancers" in 2008. Since then, he has shared his activity between clinic and research, through successive research mandates of "Fonds de la Recherche Scientifique (FSR – FNRS)" and "Foundation Against Cancer". He is supervising thoracic, sarcoma and pediatric oncology sectors, and has been actively participating to several clinical trials (investigator of local, national and international protocols). His clinician-researcher position offers the opportunity to bring the results of the translational research into the clinic, mainly in the field of new technologies, such as image-guided radiotherapy, adaptive radiotherapy, stereotactic radiation therapy and motion management strategies in moving tumours.
He is currently supervising four PhD theses, and his research has led to more than 35 peer-reviewed scientific publications.
More recently, he has joined the project of the upcoming KUL-UCL Proton Therapy centre, in which he is jointly coordinating research projects. He was recently awarded by the "Fond Baillet-Latour" for the adaptive proton therapy program, allowing to hire 4 dedicated researchers on this thematic.

Protontherapy: a favourable ballistic that will benefit patients ?

One of the cancer treatment options that is rapidly gaining interest is Proton Therapy (PT). Indeed, PT offers a significant ballistic advantage over conventional photon-based radiotherapy: the proton stops within the patient, and deposits most of its energy at the end of the path (Bragg peak), with significantly lower entrance dose and without exit dose. Because of lower integral dose and steeper dose gradient, PT is expected to better spare normal tissues from radiation exposure. This innovation is perfectly suited to the current trend towards increasingly targeted therapies, in which the differentiated effect between cancer and non-cancer tissues is expected to improve the therapeutic ratio. In that respect, PT should facilitate the safe delivery of high radiation dose in situations where the tumours are close to critical dose-limiting organs, or when deleterious effects on organs growth/ function and/or risk of secondary malignancies are foreseen, such as in paediatric patients.

Although strong scientific rational supports the use of PT in many tumour sites, the lack of definitive clinical evidence, the prohibitive cost, and the range uncertainties of proton therapy in moving and changing anatomies still restrict the scope of the clinical applications of this technology. Fortunately, research advances, ongoing randomized studies and prospective collections of clinical outcomes should help to build the required evidences to expand PT indications in the coming years.

Prof. ir. Tom Depuydt, PhD, UZ Leuven, KU Leuven

Tom Depuydt is the head of medical physics at the Radiation Oncology department and the ParTICLe Proton Therapy project of UZ Leuven and is appointed assistant professor at the Katholieke Universiteit Leuven, Belgium

Tom Depuydt obtained the degree of Master of Science in Electrical Engineering in 2000 and a Master degree in Medical Physics from the Katholieke Universiteit Leuven in 2002. He defended his PhD thesis in Medical Physics in 2014 at the Vrije Universiteit Brussel on the subject of real-time tumor tracking of moving tumors. He is a medical physicist certified by the Belgian Federal Agency of Nuclear Control since 2004. Tom Depuydt is a member of the ESTRO School faculty. He is promotor of 2 ongoing PhD's and author on more than 30 scientific peer-reviewed papers. His main fields of expertise are IMRT quality assurance, real-time adaptive motion management and he recently engaged in proton therapy related research.

Proton Therapy Technology in the Clinic

Proton therapy (PT) as a treatment modality is becoming more widely spread in the conventional radiation therapy practice. This process results in a trend toward embedding PT facilities in existing hospital environments. Also technologically PT is currently going through an important evolution moving from passive scattering delivery techniques to active pencil beam scanning, and adopting image guidance techniques from conventional radiotherapy. An overview will be given of today's technological status of PT in clinical environments and its evolution toward becoming a main-stream technology in radiotherapy.

Wiel Kleeven, Ion Beam Applications, Louvain-La-Neuve, Belgium

Wiel Kleeven did his PhD study at the Eindhoven University of Technology (EUT) on the theory of accelerated orbits, including space charge issues in cyclotrons. He then moved to Triumf for a postdoc position before returning to EUT, where he was also appointed post-doc researcher.
Since then, Wiel Kleeven is now for more than 20 years involved in the R&D activities of IBA. He developed in-house accelerator computing capabilities and participated in every major design, commissioning and improvements of medical and industrial accelerators in IBA's portfolio.
He is now still working as senior accelerator Physicist and honorary fellow at IBA, which allows him to also pursue collaborations and research of broader interests.

Accelerator, beammine and gantry technology for IBA Proton Therapy Systems

Proton therapy cancer treatment has become more and more clinically available around the world in the past decade. Ion Beam Applications (IBA), a company based in Louvain-la-Neuve, manufactures two different proton therapy systems. Both systems use a compact cyclotron for acceleration of the protons from rest up to the maximum energy of 230 MeV. The Proteus®PLUS system, using a conventional non-superconducting isochronous cyclotron, allows delivering proton beams to one or to a multiple of treatment rooms. Each of these rooms can be equipped with a 360° gantry structure that rotates around the patient. The Proteus®ONE system is a new very compact system that has been developed by IBA during the last several years and which now is clinical and being installed and commissioned at many places worldwide. This system uses a superconducting synchrocyclotron as proton driver and is currently configured in a single-room layout.
Since the used cyclotrons deliver protons at a fixed energy of 230 MeV, a separate energy degrader and energy selection system is used in the beamline in order to adjust the maximum depth of the proton beam in the patient. In the Proteus®ONE system, this energy selection system is integrated in the gantry structure, allowing for a very compact layout.
In the presentation the main technological features of the accelerators, beamlines and gantries are discussed, with an emphasis on the newest developments included in the Proteus®ONE system

Dr. Ir. Steven Peetermans, Controlatom

Steven Peetermans studied applied physics engineering at Ghent University, doing his master thesis on the MYRRHA spallation reactor. Afterwards, he joined the Paul Scherrer Institute in Switzerland, where he did his PhD on energy-resolved radiography and tomography with thermal and cold neutrons. Nowadays, he is working as a radiation protection expert at Vinçotte Controlatom. Apart from routine health physics, his work includes more 'exotic' cases such as radiation protection support in the dismantling of FBFC International and the construction of the ParTICLe proton therapy center.

Overwegingen van stralingsbescherming voor protonentherapie : innovatieve invulling van een vertrouwd concept

In this talk we'll discuss some of the considerations for radiation protection involved in the constructing and designing a proton therapy facility. The secondary neutron production as a result of proton beam losses lies at the origin of most issues. After a brief introduction in neutron-matter interaction, we'll consider its impact and imposed modifications on traditional shielding calculations. A new issue is raised as well: activation, with both short term impact (e.g. air) and long term consequences (e.g. bunker decommissioning).

Next meetings

Septembre 22 September

Journée de formation sur l'utilisation et la vérification des équipements de protection individuelle

Opleidingsdag over het gebruik en de verificatie van persoonlijke beschermingsmiddelen

Octobre 20 Oktober

Nieuw Koninklijk Besluit (ARBIS-RGPRI)

Nouvel Arrêté Royal (ARBIS-RGPRI)

Décembre 15 December

Assemblée Générale & réunion scientifique sur le thème des déchets radioactifs

Algemene vergadering & wetenschappelijke vergadering over radioactief afval

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- *Reduces the risk of secondary tumours*

PROSTATE ~~CANCER~~ PROTON THERAPY

Great book **PROTON WARRIORS**
By Harold H. Dawley Jr., Ph.D., download here

Tells men exactly what to expect in going through proton therapy and warns them about the dangers of the prostate cancer industry.