

Low Energy X-rays Hybrid MC for Fast Dose Computation(LEX-hMC)

Market sector: Software, radiotherapy

Type of opportunity: licensing and/ or co-development

Scope of the problem

Intraoperative radiotherapy (IORT) is an innovative technique that involves precise delivery of a large dose of ionizing radiation to the tumor or tumor bed during surgery. Direct visualization of the tumor bed and ability to space out the normal tissues from the tumor bed allows maximization of the dose to the tumor while minimizing the dose to normal tissues.

IORT has gained interest as an alternative to external beam radiation treatment (EBRT) in the past two decades and it is gradually spreading worldwide in the treatment of various type of tumors thanks to the development of mobile machines. However, the scientific community does not unanimously support the effectiveness of IORT and still raises concerns about introducing IORT as a standard treatment option for cancer. Current evidence demonstrates that IORT is ready for roll-out; it is time to let well-selected and informed patients be offered this treatment option in the current clinical practice.

Patient need addressed: cancer, radiation dose control during IORT

Our innovation:

- LEX-hMC is a new Software tool whose purpose is the calculation of the distribution of absorbed dose in intraoperative radiotherapy with X-rays of energy lower than 50 keV.
- LEX-hMC is able to estimate the dose distribution in a determined volume from a computed tomography image quantified in Hounsfield numbers, with a maximum deviation of 1% with respect to Monte Carlo specific codes for physics simulation of particles, both in water and in heterogeneous medium.
- Offers compatibility and integration with the Radiance® software platform.
- Make an ultra-fast dose estimate, thanks to a hybrid simulation that combines Monte Carlo methods with ray-tracing and condensation of histories (number of photons).
- Analytical or pre-calculated correction of the fluency factor, which allows further accelerate the process of dose estimation.
- Avoid the appearance of hot voxels at the edges of the applicator.
- LEX-hMC runs on personal computers with x86 architecture and Microsoft Windows operating system 7.1 or later in 64-bit version.

Competitive advantages: Satisfactory calculation of radiation dose, greater calculation speed without the high statistical noise characteristic of this type of simulation, compatibility and integration with the Radiance® software platform but also maintains a complete independent functionality, being able to be executed autonomously.

Market size/ opportunity: The global radiotherapy market is projected to reach USD 9.47 Billion by 2022 from USD 6.81 Billion in 2017, at a CAGR of 6.8% (Markets and Markets, June 2017).

In 2022, the global health care equipment & supplies market is forecast to have a value of €435.7 billion (18.6% for Other equipment segment). Geographical segmentation: USA 38.3%, Europe 31.7%, Asia-Pacific 24.2%, Middle East 0.8%, Rest of the World 5.1% (Marketline 0199-2067, November 2017).

Intellectual property

Territorial Registry of Intellectual Property, Community of Madrid: No. 16/2018/3853 (04/06/2018)