**Impact of the modelling of charge collection on the simulation of SPECT recordings from CZT semiconductors camera**

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**Introduction:** CZT cameras, such as the DSPECT one (Spectrum Dynamics®), involve a principle of direct detection to convert γ photon into an electric signal. SPECT-recordings from the DSPECT camera were already simulated with the GATE platform [1], but without considering certain physical properties of semiconductors, in particular the partial collection of charges between anode and cathode leading to a low energy tailing effect [2]. This study aimed to model this property by using the Hecht equation [3]putting in relation the amount of collected charge with the depth of interaction of the γ photon within the CZT crystal.

**Materials and methods:** The Hecht equation was used to model the response of the 9216 pixels of the DSPECT camera. A comparison was planned between the energy spectra provided by simulated and actually recorded data from a source of 99mTc setting in the air or in a diffusing environment (water cylinder of a 8.5 cm diameter).

**Results:** A good agreement was documented between the energy spectra from simulated and actually recorded data in the air as well as in the diffusing environment. An under-estimation was however documented for the low-energy photons obtained with the simulation, particularly in diffusing environment and in the lower part of the recording window of the 99mTc photopeak (relative decreases of -7.5% in the air and of -3.6% in the diffusing environment for the interactions simulated at 126 keV and compared to actual data).

**Conclusion:** The modelling of charge collection allows improving the Monte-Carlo simulation of SPECT-recording with energy spectra being close to those actually observed with CZT cameras.

**References:**

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