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Imaging methods for in-vivo Boron Neutron Capture Therapy

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Boron Neutron Capture Therapy (BNCT) is an innovative and highly selective treatment against cancer. Nowadays in-vivo dose measurements and monitoring are important issues to carry out such therapy in clinical environments. In this work, different imaging methods were tested for dosimetry and tumor monitoring in BNCT based on a Compton camera detector. A dedicated data-set was generated through Monte Carlo tools to study the imaging capabilities. First, the Maximum Likelihood Expectation Maximization iterative method was applied to study dosimetry tomography. As well, two methods based on morphological filtering and Convolutional Neural Networks respectively, were studied for tumor monitoring. The results of each method and clinical aspects such as dependence by boron concentration ratio in the image reconstruction, and the stretching effect along the detector position axis will be discussed during this talk.

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