

First Radionuclide Imaging Tests with MACACOIII+ Compton camera

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The initial tests carried out with MACACO III Compton camera for radiotherapeutical therapy (RPT) assessment developed by the IRIS group of IFIC-Valencia yielded encouraging results. Derenzo-like phantoms filled with ^{18}F -FDG and ^{131}I -NaI allowed visualization of 3 mm and 4 mm diameter rods, while in the first tests with patients treated with ^{131}I -NaI it was possible to correlate the lesions observed with the Compton camera with those of a gamma camera.

The system performance has been improved in MACACO III+ by enlarging the second detector layer for enhanced sensitivity and imaging capabilities.

Tests have been carried out addressing the difficulties in visualizing alpha-emitting radionuclides by gamma cameras. Imaging tests with Ac-225 have been carried in collaboration with the Léon Bérard hospital in Lyon. The three 6 mm diameter rods of the phantoms were filled with Ac-255 and successfully visualized. Additional tests with I-131 have been carried out in collaboration with La Fe hospital in Valencia, employing a home-made thyroid-shaped phantom. The phantom was imaged both with uniform activity and also including hot spots of different sizes in a 10:1 activity ratio. Preliminary images reproduce the phantom shape and clearly distinguish between the two situations. In addition, simulation studies with GATE support the experimental activities and allow us to estimate the potential performance with the system.

Field

Systems and applications

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