

Alpha-Particle Imaging SiPM Array Sensor with High-Resolution Technique

For a more precise evaluation of the alpha-particle emitting radiopharmaceuticals, images with a high spatial resolution are required. In this study, we propose an alpha-particle imaging SiPM Array Sensor in conjunction with a high-resolution technique. A high-resolution image is recovered using the four images obtained by moving the device along the x- and y-directions. This method uses several low-resolution images acquired by slightly shifting the alpha imaging detector. A high-resolution image is then reconstructed using the MLEM algorithm in conjunction with the measured low-resolution images and the system matrix containing the mechanical shifts, sub-sampling, and measured point spread function of the imaging system. The results show that, using the device with a pre-defined pixel resolution, the proposed technique produces the images of alpha-particles with an improved resolution of approximately 14%. We conclude that the proposed technique has potential in the development of radiopharmaceuticals for targeted alpha therapy.

Submission declaration

Original and unpublished

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Track Classification: Applications in biology, medicine, medical equipments