



NUCLEAR MEDICAL PHYSICS A REVIEW OF AN ADVANCED TECHNOLOGY

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Purpose:

This study aim to provide a comprehensive review of advanced technologies of nuclear medicine physics, with a focus on the recent developments from both hardware and software perspectives.

Materials and Methods:

Development in image reconstruction, especially time-of-flight and point-spread-function, has potential advantages due to image signal-to-noise ratio and spatial resolution. Modern detector materials and devise including LSO, CZT, and Silicon PM provided us with not only high quality digital image acquisition but also the following image processing including image reconstruction and post-reconstruction image processing. Moreover, the theranostics in nuclear medicine extended the usefulness of nuclear medicine physics far more than quantitative image-based diagnosis, in turn, raised the importance of internal radiation dosimetry in nuclear medicine.

Results/Conclusion:

Now that deep learning-based image processing can be incorporated with nuclear medicine image acquisition and image processing, all enumerated fields of nuclear medicine faced a new era of Industry v4.0. Ongoing technological developments in nuclear medicine physics mentioned above led to the image quality increases and radiation exposure decreases, in turn, to provide a quantitative and personalized healthcare.

Keywords: nuclear medicine physics, advanced techniques, digital, theranostics, deep learning, personalized healthcare

