

Abstract Submitted
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The Physical Basis of Cancer Detection Using MRI: Principles and History DONALD CHANG, Hong Kong University of Science and Technology — One of the main applications of nuclear physics is MRI, which provides a non-invasive technique for producing high-resolution images of soft tissue materials inside the human body. The MRI is a very powerful technique and is now widely used for the detection of cancer, strokes or other diseases. But what is the scientific principle behind the MRI technology? This question has often been over-looked in the current literature. It is often thought that MRI is used to image water hydrogen density in the body. But this is a misunderstanding; MRI actually images the physical/chemical environment of water hydrogen by measuring the local relaxation times and spin diffusion coefficient of proton. As one of early workers in this field, I would like to give a firsthand review about how the MRI technique was developed. Its development really owned to the collective works of several groups of physicists, chemists and physiologists from a number of institutions. In fact, the development of MRI may serve as a good example for how important innovative technologies can be developed through a cross-disciplinary effort and mutual stimulations.

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