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【206】 In-vivo range verification of proton therapy treatment with the PETITION PET scanner

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Validation of the range of protons delivered during proton therapy is important to ensure that there is no overdosage of healthy tissue or underdosage of the tumour. Positron emission tomography can image isotopes, e.g. O15 and C11, produced by nuclear interactions of the protons within the patient, giving a surrogate for delivered dose. The PETITION PET detector has been developed for in-vivo range verification. Using a rotating open-ring design, equivalently a fixed design with a movable upright patient couch, for in-beam and post-irradiation imaging of the patient we show the ability to detect anatomical changes within the patient, as well as induced shifts of <math><2\text{mm}</math>, without interruption to clinical workflows.

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