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**PHARMACEUTICAL INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

YY/T 1905-2023

**Requirements for calculation accuracy of planned dose in light
ion beam radiotherapy**

轻离子束放射治疗计划剂量计算准确性要求

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents" Drafting. Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents. This document is proposed by the National Medical Products Administration. This document is sponsored by the National Technical Committee for Standardization of Medical Electrical Appliances, Sub-Technical Committee on Radiotherapy, Nuclear Medicine and Radiation Dosimetry Equipment (SAC/TC10/SC3) centralized. This document was drafted by: Beijing Institute of Medical Device Inspection (Beijing Medical Biological Protection Equipment Inspection and Research Center), Science in China Institute of Modern Physics, Shanghai Aipqiang Particle Equipment Co., Ltd., and China Guangdong Nuclear Power Medical Technology (Mianyang) Co., Ltd. The main drafters of this document. Wang Peichen, Li Qiang, Li Rui, Wang Huiliang, Xie Bingbing, Fu Guotao, and Jiao Chunying. Light ion beam radiation therapy planning dose calculation Accuracy requirements

1 Scope

YY/T 1905 sets the requirements for how accurately a treatment planning system must calculate dose in light ion beam radiotherapy, the proton and carbon ion treatments delivered at China's growing number of particle therapy centres. Ion beams stop at a

defined depth rather than passing through, which is what makes them precise and also what makes the calculation unforgiving: a small error in predicted range moves the dose peak off the tumour and onto whatever lies behind it. This document specifies the accuracy the planning calculation has to achieve and the conditions under which it is verified. Particle therapy is a strategic investment area in Chinese oncology, with domestic systems now in clinical use. For a planning system vendor, this is the accuracy standard a Chinese registration applies.

This document specifies the requirements for the accuracy of dose calculations in light ion beam radiotherapy plans and describes the corresponding test methods. This document is applicable to light ion beam radiotherapy plans with single-core energy ranging from 10MeV/n to 500MeV/n.

2 Normative documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

YY 0637 Safety requirements for radiotherapy planning systems for medical electrical equipment

YY/T 1763 Medical electrical equipment Performance characteristics of medical light ion beam equipment

YY 9706.264 Medical electrical equipment Part 2-

64.Basic safety and basic performance of light ion beam medical electrical equipment (Require defined terms)

3 Terms and definitions

The following terms and definitions as defined in YY 0637, YY/T 1763, YY 9706.264 and IEC TR60788 apply to this document.

3.1 anastomosis distancedistancetoagreement;DTA The distance between a point on the measured dose distribution and the nearest point on the calculated isodose distribution in the plan.

3.2 energypernucleon Before the ions enter the radiation head and pass through any beam adjustment device, the total kinetic energy of the ions is divided by the number of nucleons in the nucleus. [Source: YY 9706.264-2022,201.3.211]

3.3 light ion lighion An ion species with an atomic number less than or equal to neon

($Z \leq 10$). Light ions are characterized by their proton number, nucleon number and ionization state. [Source: YY 9706.264-2022, 201.3.218]

3.4 light ion beam lightionbeam A collection of light ions moving in roughly the same direction. [Source: YY 9706.264-2022, 201.3.219]

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