

Outline of the dose calculation system IMAGINE for radiotherapy

JAERI

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The dose calculation system IMAGINE for providing accurate dose distribution in a patient body is under developing for remotely supporting radiotherapy using photons and electrons. In this system, a human model considering the elemental compositions in detail, a precise accelerator head model, and the Monte Carlo calculation are utilized to perform realistic simulation. The system runs on the ITBL (IT-based laboratory) high-performance computer at the dose calculation center located in the JAERI Kansai establishment, and the related data are transferred through a network between a hospital and the dose calculation center. Prototypes of main components constituting the system have been constructed and used for the fundamental researches. As a spectrum calculation engine which calculates the incident photon spectrum, the BEAMnrc code based on EGS4 has been employed. A dose calculation engine giving the dose distribution in a patient body has been constructed also based on EGS4. A human modeling engine can automatically segment a patient body into six different media with different elemental compositions. This system is intended to support the quality assurance of current treatments widely carried out in Japan. Further, this system is planned to apply to advanced radiotherapy such as IMRT (Intensity Modulated Radiation Therapy) and CTRTx (CT Radiotherapy). The project started in 2002 funded by JST, and the system is scheduled to be completed in 2007.