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Status of the proton linac for boron neutron capture therapy in the iBNCT project

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Accelerator-based boron neutron capture therapy (BNCT) has been studied worldwide for a novel cancer therapy using neutrons generated by an accelerator system. The iBNCT (Ibaraki BNCT) project began in collaboration with KEK, the University of Tsukuba, Ibaraki Prefecture, and private companies in Japan. The iBNCT project aims to realize linac-based BNCT with a compact and low-activation accelerator system based on the design and experiences of the J-PARC linac. It consists of an H+ ECR ion source, a 3-MeV RFQ, an 8-MeV Alvarez-DTL, and a beryllium neutron-generation target. Since a high neutron flux is required for the BNCT treatment, an average beam current of more than 1 mA is necessary with the combination of the 8-MeV proton and the beryllium target. By improving the vacuum, cooling water and low-level RF system, stable operation was achieved with an average beam current of 2 mA. After completion of the non-clinical studies in parallel with neutron beam characteristic measurements, the iBNCT project has started a clinical study in January 2024. In this contribution, the present status together with the conducted upgrade and prospects of the iBNCT accelerator will be presented.

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