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A New Proton Injector Based on PKU-type 2.45GHz PMECR for BNCT Facility

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The first fully domestically boron neutron capture therapy demonstration device located in Yangtze River Delta region based on an accelerator neutron source will be build recently. It is held by “Xi’an Jiaotong University-Huzhou Neutron Science Laboratory” joint lab established by Xi’an Jiaotong University and Huzhou Industrial Group. The BNCT facility requires a proton beam of 30 mA@40 keV at RFQ entrance, with its beam duty cycle between 0.5%-100%, and its normalized root mean square emittance less than $0.2 \pi \cdot \text{mm} \cdot \text{mrad}$. The device development cycle is 10 months. Ion source group of Peking University (PKU) is in charge of the proton ion source and its low energy beam transportation section (LEBT). A PKU type compact permanent magnet 2.45 GHz ECR ion source(PKU-Type PMECR) and a two solenoid LEBT is under development for this purpose. Further, this LEBT integrates beam chopper, absorption area for the chopped beam, ACCT, electron trap in a vacuum tube with the length of 210 mm after the second solenoid. So far, the project has completed work such as scheme demonstration, system mechanical design, ion source conditioning, and peripheral component procurement. Detail will be presented in this article.

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