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Improvement of LAPECR3 Reliability for HIMM Long Term Continuous Operation

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LAPECR3 ion source had been developed as the ion injector of Heavy Ion Medical Machine (HIMM) accelerator facility since 2009 year. The first HIMM demo facility was built in Wuwei city in 2015, and the facility had been officially licensed to treat patients in early 2020. More than 300 patients have been treated after about one year. In order to further improve the reliability of LAPECR3 ion source for long term operation, continuous research and development work has been made. For instance, a moveable and small diameter bias disc was designed as a microwave tuner to optimize plasma status, a shield ring was adopted prevent main ceramic insulator contamination caused by secondary particles. Moreover, afterglow mode has been considered as the routine operation regime to obtain higher beam intensity at the synchrotron injection and to extend lifetime of the ion source. This paper will introduce the improvement of LAPECR3 ion source and present the latest results of LAPECR3 ion source.

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