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Installation and First Results of a 1.1 kW TWT System for the AECR-U Based Ion Source at UMCG-PARTREC

Due to the demand for intense high-charged stable ion beams for medical and nuclear physics a traveling-wave-tube (TWT) based RF generator has been installed and commissioned at the Advanced Electron Cyclotron Resonance Upgrade (AECR-U) ion source at the UMCG-PARTREC facility. The generator comprises 2 x 750W in-phase combining TWT RF generators with an output frequency range of 12.75-14.5 GHz. Beside its capability to provide the plasma heating needed, it is a very convenient scanning device to identify intense and stable ion-beam regimes within the plasma-heating frequency domain. The new rf generator replaces a 14.1 GHz fixed frequency klystron. Scanning of the plasma-heating frequency allows for an increase of the beam current, for example a factor of 2 for 129Xe17+ and 67% for 4He1+ beams, this with respect to former 14.1 GHz fixed frequency. Additionally, stable regimes in the frequency spectrum are identified as the ion-beam stability is monitored at every frequency. In this paper we present the setup, the measurements, and discuss the increase in intensity, fluctuations in stability as well as the overall reproducibility of helium, carbon, and xenon ion beams. These results improve the stability and increase the beam intensity at the UMCG-PARTREC facility.
Author Keywords: [ECR Ion Source] [TWT] [Plasma Heating] [AGOR]

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Yes

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