PERFORMANCE OF THE LBNL AECR-U WITH A TWTA

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Abstract

The Advanced Electron Cyclotron Resonance - Upgrade ion source (AECR-U) at the Lawrence Berkeley National Laboratory has successfully utilized double frequency microwave heating (14.3 GHz and 10.4 GHz) for several years [1]. Recently a traveling wave tube amplifier (TWTA), providing frequencies in the range of 10.75GHz-12.75GHz, was added as a secondary heating frequency, replacing the previous 10.4 GHz Klystron. The TWTA opens the possibility to explore a wide range of secondary frequencies and a study has been conducted to understand and optimize its coupling into the AECR-U. In particular, the reflected power dependence on heating frequency has been mapped out with and without the presence of plasma. A comparison is made to determine how the presence of plasma, confinement fields, and other source parameters affect the reflected power and if and how the amount of reflected power can be correlated to the source ion beam performance.

[1] Z. Q. Xie and C. M. Lyneis, RSI 66 (1995).

Paper not received

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