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Studies on the Electron Energy Distributions in the 18 GHz High Temperature Superconducting (HTS) ECR Ion Source

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The 18 GHz High Temperature Superconducting (HTS) Electron Cyclotron Resonance Ion Source [1] is the main positive ion injector for the upcoming, High Current Injector (HCI) Programme which is presently being commissioned at IUAC, New Delhi. In general, X-ray bremsstrahlung from an ECR ion source gives an idea of the energy distributions of cold, warm and hot electrons. In our earlier studies [2], wall bremsstrahlung components were studied to understand the hot electron confinement conditions. Also, bremsstrahlung measurements were carried out to study the effect of dc bias voltage [3] on the high temperature component of the electrons. In our present work, we report on the recent measurements of bremsstrahlung ; since the production of highly charged ions is dependent on the electron energy distributions inside the plasma, the effect of the axial magnetic fields on electron energy distributions and simultaneous effect on charge state distributions will be presented.

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[1] D.Kanjilal et al., Review of Scientific Instruments, Vol.77, 03A317 (2006).

[2] R.Baskaran et al., Review of Scientific Instruments, Vol. 79, 02A324 (2008).

[3] G.Rodrigues et al., Review of Scientific Instruments, Vol. 81, 02A323 (2010).

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