18 GHz ECR Ion Source

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The first ECR plasma was drivened on Aprril 17, 2006. X-ray radiation levels were measured around the source, and 12 mm thick Fe panels were installed on both the upstream and downstream axis of the source. Additional 100mm thick Pb bricks were put on the upstrream axis where the X-ray radiation was strongest. The beam extrraction region is also shielded with a Fe wall to protect the radiation caused by the ion bombardment on electrodes and slits.

At the end of October, we started to produce highly charged Kr ions. We use an enriched ^{86}Kr gas (enrichment of 99 %) and an oxigen gas is mixed. The negatively biased electrode plased in the plasma chamber is utilized to increase the beam intensity. The electrode is a circular disc (13 mm in diameter) made of stainless steel. The inner wall of the plasma chamber is covered by a 1 mm thick Al cylinder. Figure 1 shows a typical mirror field distribution. There are four coils and the first and the last coils are connected in series. The field strengths of the RF injection side and the beam extraction side are 2.07 and 1.17 T, respectively. The minimum of the mirror magnetic field is 0.42 T. We obtain 26 eμA of ^{86}Kr^{21+} and 14 eμA of ^{86}Kr^{23+} with the RF power of 600 W. They will be accelerated to 7.3 and 8.5 MeV/u, respectivelyby, the AVF cyclotron and supplied to experiments at EN course. Figure 1 shows a typical spectrum of the charge state distribution of ^{86}Kr ions.

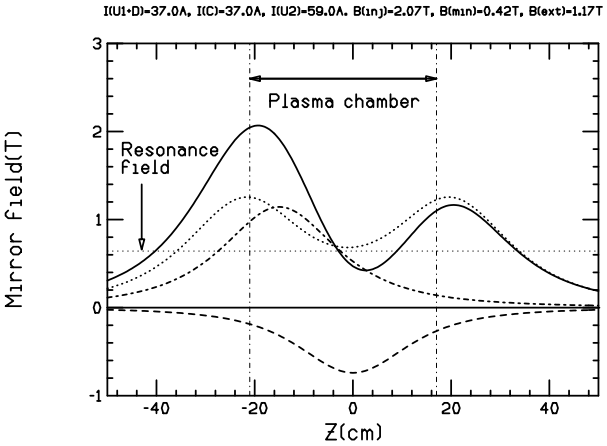

Figure 1. Mirror field distribution. The solid curve shows the sum of fields produced by four coils.

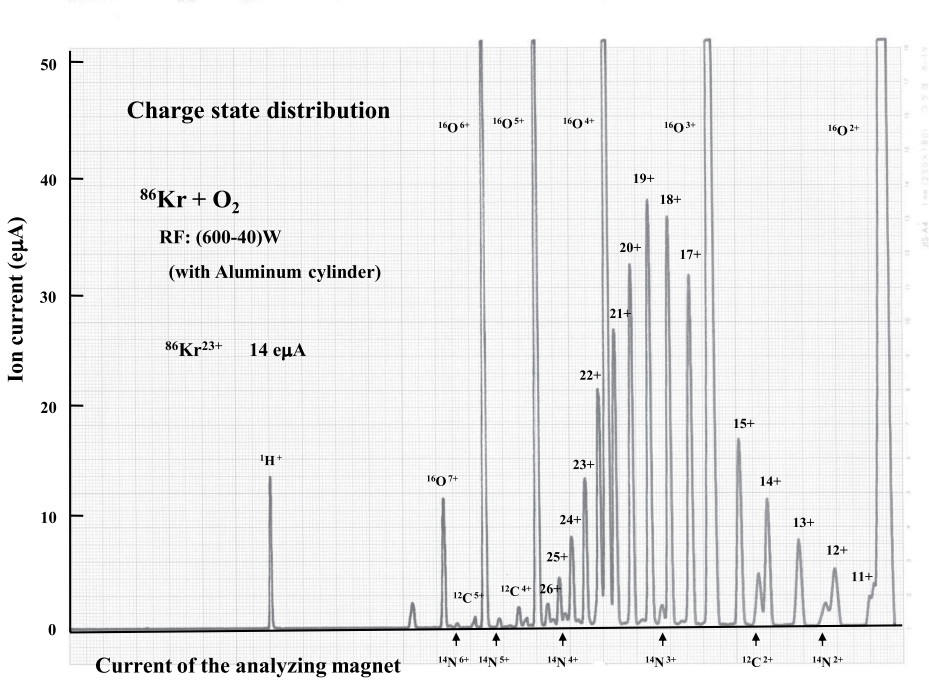

Figure 1: Charge state distribution of ^{86}Kr ions.

References

[1] K. Hatanaka *et al.*, RCNP Annual Report 2004, t 1; K. Hatanaka *et al.*, RCNP Annual Report 2005, 64.