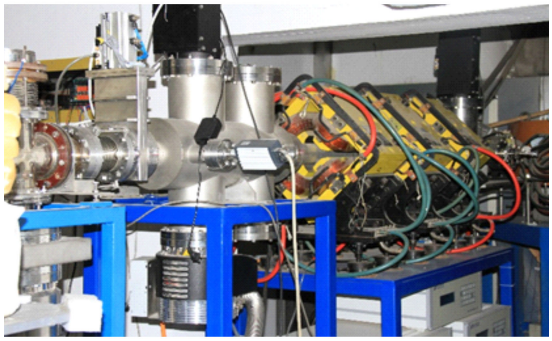

Fig. 5 (color online) Experimental terminal for astrophysics.

is a photograph of the newly built experimental terminal. The vacuum of 1.1×10^{-7} mbar was got at the injection side, and 5.0×10^{-7} mbar at the extraction. The beam transmission efficiency reached to 42%, which needs improving further. The He^{2+} ion beam with the energy of 400 keV was delivered to the terminal for the first experiment.

Diverse experiments have been performed at the platform in 2014, based on which there are about 80 SCI-indexed, 15 ISTP-indexed papers published, and there are another 5 papers published in key journals.

In summary, all the experiments whose beam-time had been approved have been carried out successfully in 2014. In addition, in order to enhance the performance of the platform, the injection component and sextupole magnet of the ECR ion source, part of the control system, power sources, and high-temperature target chamber of the material irradiation terminal have been upgraded. The platform will be tuned for more new ion species in the future to meet the requirements of experiments.

6 - 30 Au Ion Production at 320 kV High Voltage Platform in 2014

Liu Huiping, Li Jinyu, Kang Long and Zhang Tongmin

Au ion beam was demanded at the 320 kV HV platform for multi-discipline research with highly charged ions in 2014.

The oven technique was used to produce Au ions with 14.5 GHz ECR ion source at the 320 kV HV platform. Oven technique is one of the popular methods for producing ions from a solid material at present. In many cases, this technique is the most appropriate method to produce metal ion beams. It is simple in use and dose not cause carbon contamination. However, the main problem relating to this method is the operation temperature.

In December 2014, we successfully produced Au ions from 14.5 GHz ECR ion source. Au powder, of 100 ∼ 200 μm in diameter, was load in the crucible of the micro-oven. When the micro-oven power, P_{ov}, was 57.12 W, Au ions appeared. With the increasing of P_{ov}, the peaks of Au ions become higher. The typical beam intensity of Au^{24+} was 8.10 eμA when P_{ov}=76.14 W. Fig. 1 shows the screenshot of remote control. Microwave power, injection pressure and extraction pressure were 330 W, 1.3×10^{-4} Pa, 2.8×10^{-5} Pa, respectively. The negative disc bias was -40 V. Fig. 2 shows the charge state distribution of Au ions at two micro-oven power mentioned above. After 3 h, the Au^{24+} output increased to 10.23 eμA without any adjustment. We can not get more intense ion beam of Au for a long time due to the high melting point (1 377 K) and the operating temperature limitation of oven. Au^{24+} was supplied the accelerator for over 60 h.

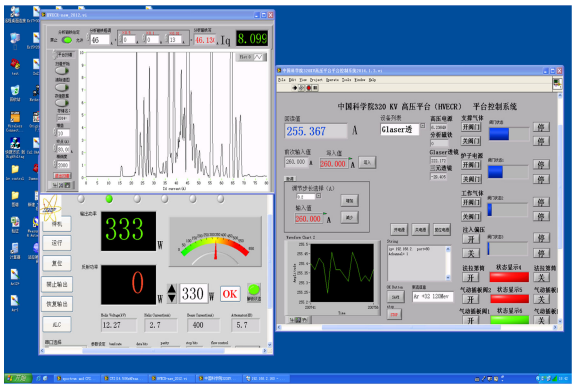

Fig. 1 (color online) Screenshot of remote control.

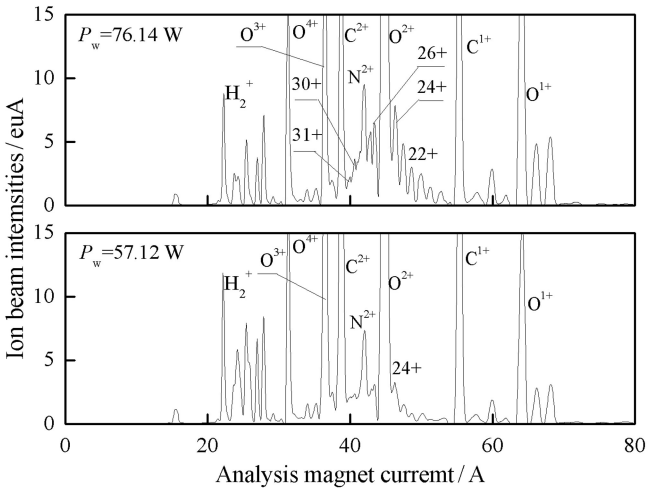

Fig. 2 Charge state distribution of Au ions. The ion source was tuned to produce Au^{24+}.

In the production of Au ions, O_2 was used as the support gas and the extraction voltage was 15 kV. The gas pressure, microwave power were adjusted to maximize the desired beam intensity.