Contribution ID: **103** Type: **Poster**

Intense Metallic Ion Production and Operation with Electron Cyclotron Resonance (ECR) Ion Sources at the Institute of Modern Physics

Tuesday, 9 September 2025 16:30 (1h 30m)

Production of intense highly charged heavy ion beams is of high challenge with an ECR ion source. To meet the strong requirements from the nuclear physics experiments various methods have been developed to produce metallic ion beams with ECR ion sources at the Institute of Modern Physics (IMP). In the recent 5 years, more than 14 different species of metallic ions have been produced with the intensity typically of hundreds of eμA at IMP. According to the specific properties of materials, several methods have been successfully developed and applied for routine operation. Low temperature oven with resistance heating and maximum working temperature around 700 degree C was used to heat material like Ca, Bi, CsI, and ZrF4. High temperature inductive heating oven with maximum service temperature about 2000 degree C was applied to produce metallic ions like Ca, Al, Cr, Mn, Fe, Ni, Sr, Gd, U, etc. For extremely refractory metals, such as Ta, U, and Th, sputtering technique with special design was developed. The technical advancement enables the production of >600 eμA of U35+, Bi31+, and reliable routine operation with intense U46+, Ta38+. In this paper, typical ion yields for various elements are presented, comparisons are shown, and the challenges to produce more intense highly charged metallic ion beams for the next generation heavy ion accelerators are also discussed.

Primary authors: QIAN, Cheng (中国科学院近代物理研究所); LI, Jibo (Institute of Modern Physics (IMP), Chinese Academy of Sciences (CAS)); Mr DENG, Ke (Institute of Modern Physics); SUN, Liangting (Institute of Modern Physics, CAS); LI, Lixuan (Institute of Modern Physics (IMP), Chinese Academy of Sciences (CAS)); Mr HONGYI, Ma (Institute of Modern Physics); Mr JINDOU, Ma (Institute of Modern Physics); Dr CAO, Pengxia (Northwest Normal University); LU, Wang (Institute of Modern Physics); Mr ZHAO, Ye (Institute of Modern Physics); FENG, Yucheng (Institute of Modern Physics, CAS); Mr WENHUI, Zhang (Institute of Modern Physics)

Presenter: LU, Wang (Institute of Modern Physics)

Session Classification: Poster Session

Track Classification: Production of highly charged ion beams