

The 236th seminar by Lijun Mao(冒立军), Institute of Modern Physics, HIAF overview: current status and future perspectives

Abstract:

The High Intensity heavy-ion Accelerator Facility (HIAF) is a major national science infrastructure in China, which was approved during the 12th Five-Year Plan. The project construction was initiated on December 23, 2018 in Huizhou city of Guangdong province. The total investment is around 2.3 billion CNY. The commissioning of the HIAF accelerator complex was successfully completed in time for first beam on October 27, 2025.

The HIAF project is aimed to provide highly-charged heavy-ion beams with highest peak current. It consists of a superconducting ECR ion source (SECR), a superconducting CW heavy ion Linac (iLinac), a fast-ramping booster ring (Bring), 6 experimental terminals and several beam lines. Various ions (from protons to uranium) can be accelerated up to the maximum magnetic rigidity of 34 Tm with an operation cycle of 3 to 5 Hz. HIAF will be the most important and highest precision nuclear mass spectrometer in the world, providing a world-leading research platform on new nuclides identification, weakly bound nuclear structures, reaction mechanisms and short-lived nuclei mass measurement.

In this report, the proposal and general design of the HIAF project will be presented. The technical challenges and solutions will be introduced. The beam commissioning and future perspectives will be discussed.

Brief introduction about the speaker:

Lijun Mao is professor at the Institute of Modern Physics (IMP), Chinese Academy of Sciences (CAS). He received his Ph.D. from University of Chinese Academy of Sciences in 2008. Then he worked as a research associate at IMP up to 2010. He worked as a postdoctoral researcher at Forschungszentrum Jülich from 2011 to 2013 and joined IMP in 2014. His research focuses on advanced heavy ion beam cooling method. His representative works in recent years include experimental demonstration of high energy electron cooling principle and development of magnetized electron cooling device. He was awarded the Dieter Mohl Prize for the contributions to the experimental work on pulsed electron beam cooling. He is in charge of the operation of the HIRFL accelerator complex and the development of the HIAF beam cooling system. He is a recipient of the National Science Fund for Distinguished Young Scholars in 2026.

Summary