

High Reliability Design for High Power RF Source Systems in Large Particle Accelerators

The RF power source system is a critical component of the CEPC, providing the high energy required to accelerate positrons and electrons in order to compensate for energy losses due to synchrotron radiation and interactions between the beam and cavity impedance. Its reliability and stability directly affect the operational efficiency of the entire facility. Based on operational experience from existing facilities, the RF power sources, due to their high power, high voltage, and active equipment characteristics, consistently exhibit high failure rates during long-term operation across all systems. Therefore, for future advanced particle accelerators, which will incorporate large clusters of RF power sources characterized by numerous devices distributed over wide areas, enhancing long-term operational reliability will pose a significant challenge and is a common issue faced by all accelerator facilities today. This paper summarizes the challenges faced, design approaches, and the processes involved in the development and testing of prototypes, providing a technical reference for achieving high reliability in large particle accelerators.

Primary authors: 刘劲东, UNKNOWN (高能所); ZHOU, Zusheng (IHEP); LI, Fei (IHEP); Mrs ZENG, yongliang; 石, 秀倩 (高能所); GAN, Nan (高能所); 何, 大勇 (高能所)

Presenter: 刘劲东, UNKNOWN (高能所)

Session Classification: Poster

Track Classification: Accelerator: 02: Accelerator technology