

技术及应用

## 大功率辐照加速器磁场系统研制

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**摘要** 针对10 MeV大功率辐照加速器研制的需求, 对其磁场系统进行研制, 此磁场系统由聚焦系统和扫描系统组成。根据束流加速运输的磁场要求, 进行了磁场设计、模拟计算。聚焦系统由6个聚焦线圈组成, 每个线圈约束磁场的径向均匀区为4 cm, 为加速管聚束段提供横向约束磁场, 实测磁场分布与束流要求计算曲线分布基本吻合。扫描磁铁采用分体结构, 扫描宽度为 $\pm 334$  mm, 最大扫描频率为 $15\text{ s}^{-1}$ , 通过优化磁极结构, 使扫描均匀度达到92%。磁场系统各项性能均满足10 MeV电子直线辐照加速器的技术要求并稳定运行至今。

关键词 [聚焦线圈](#) [扫描磁铁](#) [扫描均匀度](#) [扫描频率](#)

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## Design of Magnetic Field System for High Power Irradiation Accelerator

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**Abstract** The magnetic system is the leading and necessary equipment of the accelerator. It is composed of magnetic focusing system and scanning magnet. As the main parts of the accelerator, the magnetic field calculation and analysis must be carried out carefully to control the envelope during acceleration. Six solenoids were developed to achieve the request of design, and the radial uniform range of solenoid is 4 cm. The scanning magnet was separated for assembling simply. The scanning uniformity can achieve 92%, the scanning width is  $\pm 334$  mm, and the scanning frequency can be changed from  $5\text{ s}^{-1}$  to  $15\text{ s}^{-1}$ . The technology parameters of the magnet system reach the design value and are satisfied with the request of engineering. The magnet system works with low failure rate and high efficiency up to the present.

**Key words** [solenoid](#) [scanning](#) [magnet](#) [scanning](#) [uniformity](#) [scanning](#) [frequency](#)

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