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20~100MeV紧凑型回旋加速器轴向注入系统实验台架的物理设计

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摘要 建立 20~100MeV紧凑型回旋加速器轴向注入系统实验台架,用以进行提高回旋加速器的注入流强与效率的实验研究。在该实验台架的物理设计与元件设计中,主要考虑H⁻束从离子源引出后传输到回旋加速器中心区的运输线元件选用、物理参数匹配计算、物理元件设计等问题。设计对象是22MeV和70MeV回旋加速器的轴向注入系统,并将两者的布局、元件及几何尺寸、物理参数的选取统一,以便于实验台架的建立,从而形成适应性强的强流回旋加速器轴向注入系统。整个系统只需做少量调整就可满足能量为20~100MeV的回旋加速器注入要求。

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Design Aspects of a Test Stand for Axial Injection System of 20~100 MeV Compact Cyclotron

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Abstract To increase the injection intensity and efficiency, a test stand is designed for the axial injection system of 20~100 MeV compact cyclotron so as to implement the experimental study. The design aspects of test stand, including the optics of the beam line, the elements design etc., are described in the paper. Mostly the elements selection for the beam transportation from the H⁻ source to the central region of the cyclotron, the matching calculation and the elements design are considered. To investigate the injection system of 22 MeV and 70 MeV cyclotrons experimentally by the test stand, the design goal is to keep the layout of injection line, the dimensions of elements, the operation parameters as close as possible so that the setup of the stand is more easily. The designed system can meet the need of the H⁻ beam injection for the cyclotron from 20 MeV to 100 MeV though the dimension of the solenoid, which is installed in the main magnet of the machine, should be changed due to the different size of the magnets.

Key words [cyclotron](#) [injection](#) [beam optics](#)

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