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9MeV行波电子直线加速器加速管的物理设计

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摘要 海关大型货物在线检测用加速器采用 4MW速调管作为微波功率源,保证加速管入口功率可达 3.5MW、工作频率为 2.856MHz;以行波方式加速电子,聚束器俘获效率大于 80%;加速管全长约 220cm;电子能量设置 9、6MeV两档,对应的额定脉冲束流强度理论设计值分别为 170和300mA。本文给出了纵向粒子动力学、盘荷波导的尺寸及加速管的工作特性等方面的计算结果

关键词 [行波电子直线加速器](#) [加速管](#) [粒子动力学计算](#) [聚束器](#) [盘荷波导](#)

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Physical Design of 9 MeV Travelling Wave Electron Linac Accelerating Tube

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Abstract An accelerating tube is described in this thesis. It is a part of an accelerator used for inspection of vehicle cargoes in rail cars, trucks, shipping containers, or airplanes in customs. A klystron with power of 4 MW and frequency of 2.856 MHz will be applied to supply microwave power. The electrons can be accelerated by a travelling wave in the accelerating tube about 220 cm long, with a buncher whose capture efficiency is more than 80%. Energy of electrons after travelling through the tube can reach 9 MeV (pulse current intensity 170 mA) or 6 MeV (pulse current intensity 300 mA). Physical design of the accelerating tube, including the calculations of longitudinal particle dynamics, structure parameter and working character is carried out.

Key words [travelling wave electron linac](#) [accelerating tube](#) [particle dynamics](#) [buncher](#) [disk loaded wave guide](#)

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