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用数值模拟方法分析同轴线测量阻抗的有效性

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摘要 用同轴线方法测量加速器真空室元件的纵向和横向耦合阻抗是目前加速器实验室通常采用的标准方法,该方法的有效性问题是一直被关注的问题之一。不同于文献的讨论分析,本工作用数值模拟测量阻抗过程,分析得到同轴线结构中内导体的设计参数(包括内导体的半径和双内导体的距离)对测量结果的影响。数值模拟结果表明,内导体的设计参数在一定程度上影响测量结果的准确性,但阻抗的频谱特性是真实的。

关键词 耦合阻抗 同轴线方法 传输特性参数

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Validity Analysis of Coaxial Wire Method in Impedance Measurement by Numerical Simulation

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Abstract The coaxial wire method is the standard method to measure longitudinal and transverse coupling impedance adopted in current accelerator laboratories, and the question about its validity is the focus by accelerator physicists. Differing from other references, in the paper the measurement process is numerically simulated and the effect of inner conductor design parameters including the radius of inners and distance between inners on measurement results is analysed. The simulation results show that the inner conductor design will effect the accuracy of measurement result of impedance, but the spectrum properties of impedance is reasonable.

Key words coupling impedance coaxial wire method scattering parameters

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