

基础光学

用于铷原子频标的磁控管腔研究

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摘要:

研究了一种应用于铷原子频标的磁控管腔, 对用于磁控管腔的主要特征和参数计算进行了研究, 主要包括磁控管腔的谐振频率、Q值、微波场模式。研究表明磁控管腔的谐振频率可以调谐至6.835GHz, Q值都能够调至600~1000之间, 其微波场谐振模式是典型的TE011模式, 频率温度系数较小(32.5KHz/°C-35.0 KHz/°C), 所设计的磁控管腔能够满足铷原子钟物理部分的设计要求。

关键词: 光电子学 量子频标 磁控管腔 谐振频率 Q值

Investigation on magnetron cavity used in rubidium atomic frequency standards

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Abstract:

A research was developed on the magnetron cavity used in the rubidium atomic frequency standards, through which the main characteristics of the magnetron cavity were studied, mainly including the resonant frequency, quality factor, Oscillation mode. The results show that the resonant frequency of the magnetron cavity can be attenuated to 6.835GHz, which is the resonant frequency for the rubidium atoms, and Q-factor can be attenuated to 600~1000, the oscillation mode is typical TE011 mode which is needed for the rubidium atomic frequency standard, and the cavity has a lower frequency temperature coefficient (32.5KHz/°C-35.0 KHz/°C), therefore these derivative magnetron cavities can meet the requirements for rubidium atomic frequency standards well.

Keywords: optoelectronics quantum frequency standard magnetron cavity resonant frequency quality factor

收稿日期 2011-06-08 修回日期 2011-09-23 网络版发布日期 2012-07-01

DOI:

基金项目:

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