

光电系统与工程

一种斜入射F-P型薄膜滤光片消偏振设计方法

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摘要:

薄膜滤光片在斜入射使用时, s偏振光和p偏振光的特性会产生分离: 两偏振光的中心波长不一致, 且s偏振光的通带宽度要小于p偏振光。而采用多种材料且满足特定条件的膜系结构, 可使角度入射滤光片两偏振方向的特性趋于一致。通过理论分析, 建立了两偏振光反射率的表达式, 由表达式可看出非偏振的条件。通过计算, 求出相应材料折射率值, 从而设计出消偏振的膜系。对一个三腔129层实例膜系进行了计算求解、仿真分析及误差分析。最后的结果验证表明此方法是可行的。

关键词: 薄膜滤光片 倾斜入射 中心波长 通带宽度 消偏振设计

Depolarization F-P thin film-filter used in tilted incidence

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Abstract:

s-polarization and p-polarization will separate when thin-film filters are used in tilted incidence. Central wavelengths of the two polarization beams do not coincide with each other and pass-band width of s-polarization is less than that of p-polarization. However, the polarization characteristics of the two polarization components in incidence angle can be coincided by adopting film system architecture meeting specific conditions with more than two kinds of materials. Above all, two equations on the polarization components' reflectivity are given based on theoretical analysis. Requirements for depolarization can be found from the expressions. Then, the refractive index of the materials can be obtained. Thus, we can design depolarization film system architecture. Finally, the simulation calculations of a filter design composed of 129 layers for three cavities prove that the method is feasible.

Keywords: thin-film filter tilted incidence central wavelength band-pass width depolarization design

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