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论文

曲面和平面菲涅尔透镜的像差比较

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摘要：

通过一个大尺寸菲涅尔透镜的设计，比较了曲面菲涅尔透镜和平面菲涅尔透镜在光学像差方面的差异。从应用角度看，菲涅尔透镜设计属于准直系统，一般采用平面结构，但由于其成像要求的特殊性，通过运用P-W方法进行分析和比较，结果表明：曲面的设计较之于平面更具优势，并在ZEMAX中分别对2种菲涅尔透镜进行建模，验证了结果的正确性。但这不表明曲面菲涅尔透镜在像差方面一定比平面菲涅尔透镜更具优势，它还与实际应用场合有关，为此，提出了不同的结构参数设计。

关键词： 曲面菲涅尔透镜 平面菲涅尔透镜 球差 彗差

Aberration comparison of biconvex and plane-convex Fresnel lenses

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Abstract:

The optical aberration difference between the biconvex Fresenl lens and the plane-convex Fresenl lens was investigated by designing a large aperture Fresenl lens. Generally, the Fresenl lens is used for collimation and its structure is plane convex, but the analysis and comparison of the biconvex and the plane-convex Fresenl lenses with P-W method show that the biconvex Fresenl lens is better because of its specific imaging requirement. The two kinds of the Fresenl lenses were modeled in ZEMAX to validate the conclusion. However, it does not indicate that the biconvex Fresenl lens has advantages in all applications since it is application dependent. Therefore, Fresenl lenses should have different parameters for different applications.

Keywords: biconvex Fresenl lens plane-convex Fresenl lens spherical aberration coma

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