论文

高折射率玻璃微珠色散特性及影响

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摘要：

基于二次彩虹法用三种不同波长(632.8 nm、532 nm、404 nm)的激光测量了玻璃微珠的折射率,并由柯西色散公式拟合得到三种典型高折射率玻璃微珠1.90、1.93和2.2的色散方程,得出现行的玻璃微珠具有正常色散但色散较大的结论.通过分析在不同入射角情况下,色散对玻璃微珠回归反射性能的影响,得出折射率1.90和1.93的玻璃微珠具有优良的回归反射性能.此外,用光线追迹模拟了色散对回归反射后光能量在近轴区域分布的影响,折射率1.90和1.93的玻璃微珠回归反射光线的能量主要集中在5°范围内.

关键词： 玻璃微珠 二次彩虹 色散 回归反射

Dispersion Characteristic and Its Effect of High Refractive Index Glass Beads

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Abstract:

Based on the secondary rainbow principle, three kinds of glass beads with typical refractive indices 1.90, 1.93 and 2.2 are measured by semiconductor lasers with three different wavelengths (632.8 nm, 532 nm and 404 nm). Then dispersion functions are determined according to Cauchy function and experimental results, which show that the normal dispersion characteristic belongs to the glass beads but with the large amount. By analyzing whether the dispersion has effect on retroreflective capability with different incident angles from 0° to 90°, it shows that the retroreflective capability of glass beads with refractive index 2.2 is inferior to those of 1.90 and 1.93. Additionally, the energy distribution of retroreflect lights in the paraxial region is simulated by ray tracing method. And the results indicate that the retroreflective energies of glass beads with refractive indices 1.90 and 1.93 are mainly concentrated in the range of 5°.

Keywords: Glass bead Secondary rainbow Dispersion Retroreflection

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