

论文

2057水平平板上静态液滴的光学效应研究

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摘要:

对液滴表面的光学衍射效应进行实验研究.当用一准直、扩束的激光束自下而上,垂直照射水平放置的平板上的静态液滴表面时,得到了清晰、稳定的衍射图样.衍射图样的强度分布随着入射光束半径的变化而变化.当激光束半径改变到某一特定大小时,衍射图样中心条纹消失.通过对衍射条纹的分布与液体表面形态的理论分析,并根据物理光学原理,得到了条纹强度分布与激光束半径和入射面液面最大高度之间比值是相关的.基于这一发现,提出了一种液滴表面研究的非接触、有效实验方法.

关键词: 光学效应 静态液滴 傅里叶变换

Liquid Drop Surface on Horizontal Plane by Means of Optical Method

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Abstract:

The optical effect of the steady droplet on the horizontal plane was studied.When a collimated-beam illuminated upon the symmetric droplet surface form below in a vertical direction,the steady and visible diffraction pattern was observed experimentally,and the relationship between the intensity distribution of the pattern and the illuminated area covered by the beam was found.While the diameter of the beam changes from larger to small,the intensity distribution of the pattern changes,either.The disappearance of the zero-order diffraction fringe,which corresponds to the 100% efficiency,was also observed in the experiment.Based on the physical optical theory,the analytic expression of the intensity distribution of pattern was derived,which explained the disappearance of the zero-order fringe well,and the height of the droplet at the certain position was also obtain.A novel method for the axisymmetric liquid surface deposited on the horizontal plane was found.

Keywords: Optical effect Steady liquid droplet Fourier transform

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