

论文

自由立体显示器中锯齿状交错狭缝光栅的设计

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摘要:

光栅式自由立体显示由于易存在莫尔条纹和串扰的问题而影响其显示效果.利用斜光栅可减轻莫尔条纹但增加了视点间的串扰.本文提出一种减轻莫尔条纹的光栅设计方法,同时对可视区域影响较小.设计中光栅进行分段,并将相邻两段狭缝错开一定距离.该方法能减小通过同一狭缝看到两相邻子像素之间的黑条的比例,获得较宽且较淡的莫尔条纹,从而减轻了视觉干扰.仿真结果表明该光栅相比传统垂直光栅,莫尔条纹亮度下降了108.1%,而可视区域仅减小32.8%,具有较高的实用价值.

关键词: 自由立体显示 锯齿状交错狭缝光栅 莫尔条纹 串扰

Design of Zigzag Staggered Barrier for Autostereoscopic Display

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Abstract:

Parallax barrier based autostereoscopic display is usually impaired by moire fringe and crosstalk. By using slanted parallax barrier, the moire fringes could be obviously eliminated, but often at the expense of serious image crosstalk. This paper presents a kind of zigzag staggered barrier which can reduce the moire fringe with little impact on the stereo viewing zones. The slits are divided into sections and the adjacent two jagged-edged sections are separated horizontally at a certain distance. This method can reduce the proportion of the perceived black matrix seen through the same slit, which increases the brightness of the dark part of the moire fringe. In this way, wider and weaker moire fringes are acquired. The simulated results show that the minimum perceived moire fringes' brightness decreases by 108.1% and the viewing zones decrease by 32.8% compared with the vertical parallax barrier. And it has higher practical value for autostereoscopic display.

Keywords: Autostereoscopic display Zigzag staggered barrier Moire fringe Crosstalk

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参考文献:

[1] QIN K H, LUO J L. Techniques for autostereoscopic display and its development[J]. *Journal of Image and Graphics*, 2009, 14(10): 1934-1941.

[2] LIANG F Y, DENG S X, YANG Y Y. Research on panel and system structure of naked-eye stereoscopic display [J]. *Journal of Electronic Measurement and Instrument*, 2005(s1): 104-108.

[3] WALLEEN M, HUANG Y P, HAN P D. Enhancing brightness of parallax barrier based 3D flat panel mobile displays without compromising power consumption[J]. *Journal of Display Technology*, 2010, 6(2): 60-64. 

[4] WANG A H, WANG Q H. Overview on autostereoscopic display device based on parallax barrier or lenticular lens [J]. *Advanced Display*, 2009, 20(10): 12-17.

[5] ZHAN R L, ZHAN W X, WANG Q H. Research on stereo viewing zone in autostereoscopic display based on parallax barrier [J]. *Acta Photonica Sinica*, 2008, 37(5): 960-963.

[6] WANG Y Q. Auto-stereoscopic display based on LCD[J]. *Chinese Journal of Liquid Crystals and Displays*, 2003, 18(2): 116-120.

[7] WANG Q H, TAO Y H, LI D H. 3D autostereoscopic liquid crystal display based on lenticular lens[J]. *Chinese Journal of Electron Devices*, 2008, 31(1): 296-298.

[8] LIU W W, DENG S X, HUANG Y G. Simulation research on the principle of parallax illumination in the auto-stereoscopic display[J]. *Journal of Hefei University of Technology*, 2005, 28(15): 1540-1569.

[9] SA K. Parallax polarizer barrier stereoscopic 3D display system. Proceedings of the 2005 International Conference on Active Media Technology, 2005: 469-474.

[10] ZHU Y L, CHEN R G, XIE J. Principle of moire fringe in autostereoscopic display based on parallax barrier and lenticular lens[J]. *Chinese Journal of Liquid Crystals and Displays*, 2009, 24(6): 911-915.

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[11] WEN J T,HUY H,LV G Q.Research of ghosting of parallax displays[J]. *Chinese Journal of Liquid Crystals and Displays*,2007,22(3): 310-314.

[12] DODGSON N A.Autostereoscopic 3D displays[J]. *IEEE*,2005,38(8): 31-36.

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1. 孙琛;沈亦兵;白剑;侯西云;杨国光.Ronchi光栅Talbot效应长焦距测量的准确度极限研究[J]. *光子学报*, 2004,33(10): 1214-1217
2. 赵仁亮 赵悟翔 王琼华 李大海 王爱红 辛燕霞.狭缝光栅自由立体显示器立体可视区域的研究[J]. *光子学报*, 2008,37(5): 960-963
3. 段存丽 陈芳 祁瑞利 张苏娟.利用莫尔条纹测量物体三维形貌新方法研究[J]. *光子学报*, 2008,37(7): 1425-1428
4. 徐进 陈浙泊 李燕 倪旭翔 陆祖康.可编程成像系统中莫尔条纹处理方法研究[J]. *光子学报*, 2008,37(2): 325-327
5. 王军 陈磊.用短相干光源测量平行平板玻璃的光学均匀性[J]. *光子学报*, 2008,37(12): 2515-2519
6. 吴文明 高立民 吴易明 吴瑾罡.纵向莫尔条纹在自准直仪中的应用[J]. *光子学报*, 2008,37(12): 2544-2547
7. 吴玲玲|吴国俊|仓玉萍|陈良益.利用Talbot效应的焦距测量技术的研究*[J]. *光子学报*, 2008,37(Sup2): 198-201
8. 王也.莫尔条纹分析在数字全息存储器中的应用 [J]. *光子学报*, 2009,38(11): 2972-2974
9. 邓欢,王琼华,李大海,赵悟翔,陶宇虹,王爱红.平行摄像机阵列移位法获取视差图像的研究 [J]. *光子学报*, 2009,38(11): 2985-2988
10. 刘鹏 高立民 赵素文.CCD在自准直仪中用于莫尔条纹成像研究[J]. *光子学报*, 2010,39(3): 494-498
11. 方恩博 李大海 王琼华 文福林.自由立体显示器上立体鼠标的实现及其应用研究[J]. *光子学报*, 2010,39(4): 605-609
12. 方靖岳 秦石乔 王省书 黄宗升 郑佳兴.莫尔条纹法测量微小旋转角度的频域分析[J]. *光子学报*, 2010,39(4): 709-713
13. 吴玲玲,吴国俊,仓玉萍,陈良益.基于Talbot-Moiré法测量透镜焦距的莫尔条纹的图像处理 [J]. *光子学报*, 2010,39(9): 1723-1727
14. 马俊,倪旭翔.基于互信息的高动态范围成像系统成像质量分析 [J]. *光子学报*, 2010,39(10): 1825-1829
15. 吴玲玲,吴国俊,仓玉萍,陈良益.基于Talbot-Moiré法测量透镜焦距的CCD亚像素标定技术 [J]. *光子学报*, 2010,39(10): 1896-1900

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