Accepted Manuscript

Title: Outfield experiment of semiconductor laser jamming on color CCD camera

Authors: Wei Tang, Rui Wang, Tingfeng Wang, Jin Guo

PII: S0030-4026(18)30772-1

DOI: https://doi.org/10.1016/j.ijleo.2018.05.121

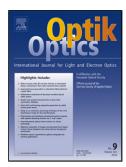
Reference: IJLEO 60984

To appear in:

Received date: 10-4-2018 Accepted date: 26-5-2018

Please cite this article as: Tang W, Wang R, Wang T, Guo J, Outfield experiment of semiconductor laser jamming on color CCD camera, *Optik* (2018), https://doi.org/10.1016/j.ijleo.2018.05.121

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



ACCEPTED MANUSCRIPT

Outfield experiment of semiconductor laser jamming on color CCD camera

Wei TANG, Rui WANG, Tingfeng WANG, Jin GUO

State Key Laboratory of Laser Interaction with Matter, Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun, Jilin 130033, China

The highlights of this article are as follows:

- Set up laser dazzling model of color CCD imaging system and prove it.
- Out-field laser dazzling experiment of color CCD imaging system irradiated by
- semiconductor laser is performed.
- Laser jamming mechanism is analyzed.
- The relationship between optical saturation areas and laser power density is obtained.
- Laser dazzling effect of zoom optical system is analyzed.

Abstract:

Outfield laser jamming experiment of color charge coupled device (CCD) irradiated by semiconductor laser was performed. The impact of incident power density I_0 and the focus length f on laser jamming results was obtained. Laser jamming model of color CCD camera is set up, and theoretical proving and analysis on experimental results are completed. Laser jamming effects on color CCD camera irradiated by semiconductor laser is obvious, CCD surface appears obvious optical saturation and crosstalk phenomena, and optical saturation areas gradually enlarge with the increase of power density to target and the focus length f. Simulation results are basically coincident with experimental results, and it proves laser jamming model is correct. We argue that optical saturation phenomenon should be caused by laser diffraction effect, and the impact of the focus length f should be mainly due to laser energy truncated by the aperture. The conclusions have a reference value for color CCD in aerospace.

Key words: laser jamming; color CCD camera; semiconductor laser; optical saturation and crosstalk **OCIS codes**:040.1520 CCD, charge-coupled device; 140.3330 Laser damage; 140.5960 Semiconductor lasers

1 Introduction

Charge coupled device (CCD) is widely used in detection, recognition, identification, tracking and inspection, either for civilian or military purposes. However, they can be easily dazzled by high power laser. To avoid the jamming effects, its phenomena and mechanisms must be known and understood. Recently, researches on laser jamming photoelectric device especially CCD device are reported^[1-4]. The researches almost cover all from the visible to the infrared band, and a lot of

Download English Version:

https://daneshyari.com/en/article/11004307

Download Persian Version:

https://daneshyari.com/article/11004307

Daneshyari.com