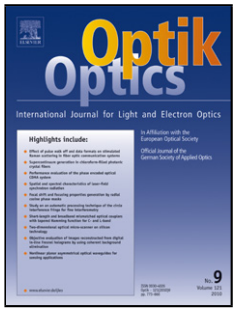

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Outfield experiment of semiconductor laser jamming on color CCD camera

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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