

# 目 次

## ◆ 特约专栏——新型红外器件◆

- 基于光热载流子调控的二维材料红外与太赫兹探测器研究进展 ..... 朱久泰, 郭万龙, 刘 锋, 等 0103001  
Sb<sub>2</sub>Te<sub>3</sub>量子点的制备、结构及红外性质研究 ..... 梁 晶, 周亮亮, 李 斌, 等 0103002  
基于石墨烯的红外探测机理与器件结构研究进展 ..... 杨 旗, 申 钧, 魏兴战, 等 0103003  
锗近红外光电探测器制备工艺研究进展 ..... 黄志伟, 汪建元, 黄 巍, 等 0103004  
InP 基自由运行模式单光子 APD ..... 史衍丽, 朱泓遐, 杨雪艳, 等 0103005  
短波红外 InGaAs 焦平面探测器研究进展 ..... 李 雪, 邵秀梅, 李 淘, 等 0103006  
320×256 InAs/GaSb 超晶格中/短波双色探测器组件研制 ..... 吕衍秋, 彭震宇, 曹先存, 等 0103007  
GaAs/AlGaAs 量子阱长波 10.55 μm 红外焦平面探测器 ..... 李向阳, 李 宁, 许金通, 等 0103008  
高性能低噪声数字读出电路 ..... 姚立斌, 陈 楠 0103009  
碲镉汞红外焦平面器件技术进展 ..... 丁瑞军, 杨建荣, 何 力, 等 0103010  
甚高灵敏度红外探测器读出电路研究进展 ..... 陈 婕, 李立华, 梁 艳, 等 0103011

## ◆ 非线性光学◆

- 铟酞菁/氧化石墨烯高分子材料的制备及非线性光限幅性能研究 ..... 马鹏飞, 刘大军, 周奋国 0107001

## ◆ 红外技术及应用◆

- 红外用机械制冷机驱动电路的共模干扰机理 ..... 张家昆, 杨宝玉, 孙德新 0104001  
热红外高光谱成像仪光谱匹配盲元检测算法 ..... 张长兴, 刘成玉, 亓洪兴, 等 0104002  
基于理论解析方法的高真空羽流流动及红外辐射研究 ..... 包醒东, 余西龙, 毛宏霞, 等 0104003  
综合相似性在红外目标隐身效果评估中的应用 ..... 赵晓枫, 魏银鹏, 杨佳星, 等 0104004

## ◆ 激光器与激光光学◆

- 双光路快速调谐脉冲CO<sub>2</sub>激光器 ..... 郑义军, 朱子任, 谭荣清, 等 0105001  
傅里叶光谱仪平动式光程扫描控制系统设计 ..... 郭兰杰, 马文坡, 王 淳, 等 0105002  
雷达定标卫星光学散射特性研究 ..... 王建峰, 姜晓军, 李陶然, 等 0105003  
激光雷达场景三维姿态点法向量估计方法 ..... 张 楠, 孙剑峰, 姜 鹏, 等 0105004  
基于选择性激光改性的双陶瓷层热障涂层界面增韧方法(英文) ..... 高 磊, 李慧芸 0105005  
激光探测尾流微气泡的偏振特性研究 ..... 唐 勇, 张 宇 0105006

## ◆ 光电测量◆

- 基于干涉测量的Φ1.3 m 非球面反射镜定心 ..... 王 聪, 陈佳夷, 栗孟娟, 等 0113001  
基于波长调制技术的吸收谱线型函数测量 ..... 周佩丽, 谭 文, 彭志敏 0113002  
基于主动光幕阵列静爆试验破片速度测量方法 ..... 杨久琪, 董 涛, 陈 丁, 等 0113003  
多场景下结构光三维测量激光中心线提取方法 ..... 宋晓凤, 李居朋, 陈后金, 等 0113004  
基于 C-TOF 成像的位姿测量与地物目标识别技术研究 ..... 卢纯青, 杨孟飞, 武延鹏, 等 0113005

◆ 光学设计 ◆

- 新型副镜并联调整机构非线性特性及校正 ..... 叶 宇,乐中宇,顾伯忠,等 0114001  
大视场曲面仿生复眼光学系统设计 ..... 胡雪蕾,高 明,陈 阳 0114002  
可见光全天时遥感相机光学系统设计 ..... 孙永雪,夏振涛,姜守望,等 0114003

◆ 光学器件 ◆

- 基于偏振光栅的一维集成成像双视 3D 显示 ..... 范 钧, 刘泽晟, 邓 慧 0116001  
光微流控可调谐渐变折射率透镜特性研究 ..... 李冬冬, 吕 迪, 韩冬冬, 等 0116002

◆ 光通信与光传感 ◆

- 基于狭缝波导的聚合物基微环折射率传感器研究 ..... 吕恒林, 梁宇鑫, 韩秀友, 等 0118001

◆ 图像处理 ◆

- 基于梯度方向一致性和特征分解的红外小目标检测算法 ..... 范明, 田少卿, 刘凯, 等 0126001  
末敏弹线阵列激光雷达的距离像分割方法 ..... 姜云, 郭锐, 刘荣忠, 等 0126002  
算力限制平台下的长时目标跟踪 ..... 王向军, 郭志翼 0126003

本刊电子版彩色效果详见《红外与激光工程》官网 [www.irla.cn](http://www.irla.cn)

## Contents

### ❖ Special issue—New infrared device ❖

Research progress of infrared and terahertz detectors based on two-dimensional materials regulated by photo-hot carrier .....	Zhu Jiutai, Guo Wanlong, Liu Feng, et al. 0103001
Research on the preparation, structure and infrared properties of Sb <sub>2</sub> Te <sub>3</sub> quantum dots .....	Liang Jing, Zhou Liangliang, Li Bin, et al. 0103002
Recent progress on the mechanism and device structure of graphene-based infrared detectors .....	Yang Qi, Shen Jun, Wei Xingzhan, et al. 0103003
Research progress of technologies for germanium near-infrared photodetectors .....	Huang Zhiwei, Wang Jianyuan, Huang Wei, et al. 0103004
InP-based free running mode single photon avalanche photodiode .....	Shi Yanli, Zhu Hongxia, Yang Xueyan, et al. 0103005
Developments of short-wave infrared InGaAs focal plane detectors .....	Li Xue, Shao Xiumei, Li Tao, et al. 0103006
320×256 mid-/short-wavelength dual-color infrared detector based on InAs/GaSb superlattice .....	Lv Yanqiu, Peng Zhenyu, Cao Xiancun, et al. 0103007
GaAs/AlGaAs QWIP IRFPA for 10.55 μm long wavelength .....	Li Xiangyang, Li Ning, Xu Jintong, et al. 0103008
High-performance low noise digital readout circuit .....	Yao Libin, Chen Nan 0103009
Development of technologies for HgCdTe IRFPA .....	Ding Ruijun, Yang Jianrong, He Li, et al. 0103010
Progress of very high sensitivity infrared detector readout circuit .....	Chen Xiao, Li Lihua, Liang Yan, et al. 0103011

### ❖ Nonlinear optics ❖

Study on preparation and performance of nonlinear optical limiting of polymers material containing indium phthalocyanine and graphene oxide .....	Ma Pengfei, Liu Dajun, Zhou Fengu 0107001
---	---

### ❖ Infrared technology and application ❖

Common-mode interference mechanism of the driving circuit of cryocooler used on infrared system .....	Zhang Jiakun, Yang Baoyu, Sun Dexin 0104001
Blind pixel detection algorithm using spectral matching for thermal infrared hyperspectral imager .....	Zhang Changxing, Liu Chengyu, Qi Hongxing, et al. 0104002
Research on fluid field and infrared radiation of vacuum plume based on theoretical analytical method .....	Bao Xingdong, Yu Xilong, Mao Hongxia, et al. 0104003
Application of comprehensive similarity in the evaluation of infrared target stealth effect .....	Zhao Xiaofeng, Wei Yinpeng, Yang Jiaxing, et al. 0104004

### ❖ Lasers & laser optics ❖

Rapidly tuned pulsed CO <sub>2</sub> laser with dual optical path .....	Zheng Yijun, Zhu Ziren, Tan Rongqing, et al. 0105001
Design of translating optical path scanning control system for Fourier spectrometer .....	Guo Lanjie, Ma Wenpo, Wang Chun, et al. 0105002
Research on optical scattering of radar calibration satellite .....	Wang Jianfeng, Jiang Xiaojun, Li Taoran, et al. 0105003
Pose estimation algorithms for lidar scene based on point normal vector .....	Zhang Nan, Sun Jianfeng, Jiang Peng, et al. 0105004
A toughening method of the interface in double-ceramic-layer thermal barrier coating based on selected laser modification ...	

..... Gao Lei, Li Huiyun 0105005

Research on polarization characteristics of micro–bubbles laser detection in wake ..... Tang Meng, Zhang Yu 0105006

**❖ Photoelectric measurement ❖**

Centering of Φ1.3 m aspheric reflector based on interferometry ..... Wang Cong, Chen Jiayi, Li Mengjuan, et al. 0113001

Measurement of absorption line profile function based on wavelength modulation technology .....

..... Zhou Peili, Tan Wen, Peng Zhimin 0113002

Measurement method for fragment velocity based on active screen array in static detonation test .....

..... Yang Jiuqi, Dong Tao, Chen Ding, et al. 0113003

Laser centerline extraction method for 3D measurement of structured light in multi–scenarios .....

..... Song Xiaofeng, Li Jupeng, Chen Houjin, et al. 0113004

Research on pose measurement and ground object recognition technology based on C–TOF imaging .....

..... Lu Chunqing, Yang Mengfei, Wu Yanpeng, et al. 0113005

**❖ Optical design ❖**

Nonlinear characteristic and correction for new–style parallel adjustment mechanism of secondary mirror .....

..... Ye Yu, Yue Zhongyu, Gu Bozhong, et al. 0114001

Design of curved bionic compound eye optical system with large field of view ..... Hu Xuelei, Gao Ming, Chen Yang 0114002

Optical system design of remote sensing camera with visible light all–day .....

..... Sun Yongxue, Xia Zhentao, Jiang Shouwang, et al. 0114003

**❖ Optical devices ❖**

One–dimensional dual–view integral imaging 3D display based on polarizer parallax barrier .....

..... Fan Jun, Liu Zesheng, Deng Hui 0116001

Study on the properties of optical microfluidic tunable gradient refractive lens .....

..... Li Dongdong, Lv Di, Han Dongdong, et al. 0116002

**❖ Optical communication and sensing ❖**

Study on refractive index sensor of polymeric–based microring based on slot waveguide .....

..... Lv Huanlin, Liang Yuxin, Han Xiuyou, et al. 0118001

**❖ Image processing ❖**

Infrared small target detection algorithm based on gradient direction consistency and eigendecomposition .....

..... Fan Mingming, Tian Shaoqing, Liu Kai, et al. 0126001

Distance image segmentation method for terminal sensitive missile linear array laser radar .....

..... Jiang Yun, Guo Rui, Liu Rongzhong, et al. 0126002

Long–term target tracking algorithms in force–constrained platform ..... Wang Xiangjun, Guo Zhiyi 0126003