

## 论文

## 红外双色复合仿真系统测温技术研究

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## 摘要:

为了模拟红外制导时目标和干扰的等效辐射环境,并比较单色测温 and 比色测温两种方法在复杂环境下目标测温效果的差异,利用红外双色复合仿真系统对空间6 km处目标和干扰弹进行了实物模拟.通过准确标定的热像仪,采用单色和比色测温两种方法对不同温度的目标和干扰进行测试.利用经标定的中波热像仪和长波热像仪对黑体测温,黑体温度为(20~60)℃时,长波热像仪的绝对误差限为0.5℃;黑体温度为(50~120)℃时,中波热像仪的绝对误差限为0.2℃.当目标温度为500℃、干扰温度为1 000℃时,用长波红外、中波红外、比色方法测得的目标温度分别为28.5℃、148.3℃、322.4℃,干扰温度分别为56.7℃、223.2℃、660.1℃.实验结果表明,在复杂环境下采用比色测温方法更能真实反映目标的温度特性.

关键词: 红外制导 热像仪 复合仿真系统 比色测温

## Thermometry Technology of IR Dual Color Composite Simulation System

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## Abstract:

In order to simulate the equivalent radiation environment of target and interference in the IR guidance process, and compare the effect of differences in target thermometry between monochromatic thermometry and chromatic thermometry under complex environment, the target and interference on space 6 km is simulated using IR dual color composite simulation system. Through the IR thermal imager calibrated accurately, the target and interference at different temperatures is tested using two methods of temperature measurement-monochromatic thermometry and chromatic thermometry. Blackbody temperature is measured by calibrated MW thermal imager and calibrated LW thermal imager, in the range from 25℃ to 40℃ of Blackbody temperature, the absolute error limit of LW thermal imager is 0.5℃, and in the range from 50℃ to 120℃ of Blackbody temperature, the absolute error limit of MW thermal imager is 0.2℃. When the target temperature is 500℃ and the interference temperature is 1000℃, the temperatures of target measured with LWIR, MWIR and chromatic thermometry are 28.5℃, 148.3℃ and 322.4℃, and the temperatures of interference are 56.7℃, 223.2℃ and 660.1℃ respectively. The experiment result indicates that the characteristics of target temperature can be better reflected using chromatic thermometry than monochromatic thermometry under complex environment.

Keywords: IR guidance Thermal imager Composite simulation system Chromatic thermometry

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