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激光与光电子技术应用

1.06μm激光的大气传输仿真研究

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摘要： 为了研究激光的大气传输特性，基于激光大气传输的一般模型，建立了激光传播到某一距离的功率衰减公式。采用定性定量的方法，利用MATLAB软件对模型进行仿真计算，分析了1.06μm激光大气传输的大气透过率以及到靶功率。结果表明，该模型对激光干扰空间探测器、清除微小碎片等提供了可靠的理论依据。这对于深入研究激光的大气衰减特性有一定参考价值。

关键词： 激光技术 激光传输 大气衰减 仿真 空间碎片

Simulation of atmospheric transmission characteristics of laser at 1.06μm

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Abstract: To study the atmospheric transmission characteristics of laser, the laser power attenuation formula was established at a certain distance based on the general model of laser atmosphere transmission. The laser atmospheric transmittance at 1.06μm and the power onto the target were calculated with MATLAB software. Results show that the model provides the reliable theory basis for laser influencing space probe and remove of tiny pieces, and certain reference for further study about laser atmospheric attenuation characteristics.

Keywords: laser technique laser transmission atmospheric attenuation simulation space debris

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参考文献：

[1] SUN H Y,ZHANG Y H,HAN Y.Military laser technology[M].Beijing:National Defence Industry Press,2012:1(in Chinese).
[2] GAO G Q,XIANG J,LI Y X,*et al*.Efficiency research of laser jamming photoelectric detector in early-warning satellite of infrared system based on the sky[J].Laser and Infrared,2010,40(2):174-177(in Chinese).
[3] ZHANG Y X,CHI Z Y.Light waves in the atmosphere transmission and imaging[M].Beijing:National Defence Industry Press,1997:5-17,63-82(in Chinese).

[4] SUN X Q,LV Y G.Laser principle and technology[M].Beijing:The Chinese People's Liberation Army Press,2000:120-150(in Chinese).
[5] LI H Y, HU Y N, LIU X D. Energy estimation method for laser disturbing photoelectrical detectors in remote distance[J]. Infrared and Laser Engineering, 2010, 39(6): 1038-1043(in Chinese).
[6] CHEN X H,WEI H L,LI X B,*et al*.Calculating model for aerosol extinction from visible to far infrared wavelength[J].High Laser and Particle Beams,2009,21(2):183-186(in Chinese).
[7] WANG Sh Y,FU Y Y,GUO J.Evaluation of high energy laser effecting on remote distance photoelectron sensor system[J].Optical Technology,2002,28(1):28-30(in Chinese).
[8] LI H Y, HU Y N,LIU X D. Energy estimation method for laser disturbing photoelectrical detectors in remote distance[J]. Infrared and Laser Engineering, 2010, 39(6): 1038-1043(in Chinese).
[9] SUN Z L.With infrared photoelectric system manual[M].Tianjin:The 8358 Institute of China Aerospace Industry Corporation,1998:291(in Chinese).
[10] SUN Y,WAN M.High energy laser system[M].Beijing:National Defence Industry Press,2004:127-150 (in Chinese).

本刊中的类似文章

1. 陈爽, 冯莹, 王玲.基于GLM的多模光纤放大器模式控制研究[J]. 激光技术, 2010,34(1): 128-131
2. 于益, 王卫民, 鲁燕华, 谢刚, 彭跃峰.二极管激光光谱合束技术实验研究[J]. 激光技术, 2010,34(1): 138-140
3. 张芳沛, 楼祺洪, 李红霞, 韩文杰, 邢宇华, 董景星, 沈严, 薛海中.1064nm激光诱导等离子体开关控制355nm脉宽可调输出[J]. 激光技术, 2010,34(1): 17-19,40
4. 卢彦兆, 王新兵, 董句, 张学玲.双波长可调谐TEA CO_2激光器的脉冲输出特性[J]. 激光技术, 2010,34(1): 88-90,94
5. 何建平, 周智, 吴源华, 欧进萍.光纤布里渊与布喇格光栅共线技术的温度互补偿[J]. 激光技术, 2010,34(1): 13-16
6. 余阳春, 王春明, 余圣甫.5A06 铝合金的激光填丝焊接头组织与性能[J]. 激光技术, 2010,34(1): 34-36,52
7. 秦海永 张永康 尤建.高能激光辐照诱导声波频率特性的实验研究 [J]. 激光技术, 0,(): 105-105
8. 储晓猛, 顾佩兰, 杨建新.高密度聚乙烯塑料激光焊接工艺参量试验研究[J]. 激光技术, 2010,34(1): 116-119
9. 姜银方, 应才苏, 刘赤荣, 石朝阳, 周桂生.激光功率密度对板料激光冲击成形性能的影响[J]. 激光技术, 2010,34(1): 95-98
10. 柳娟, 唐霞辉, 彭浩, 秦应雄, 邓前松.高效率3工位激光焊接系统的控制优化[J]. 激光技术, 2010,34(1): 56-59
