

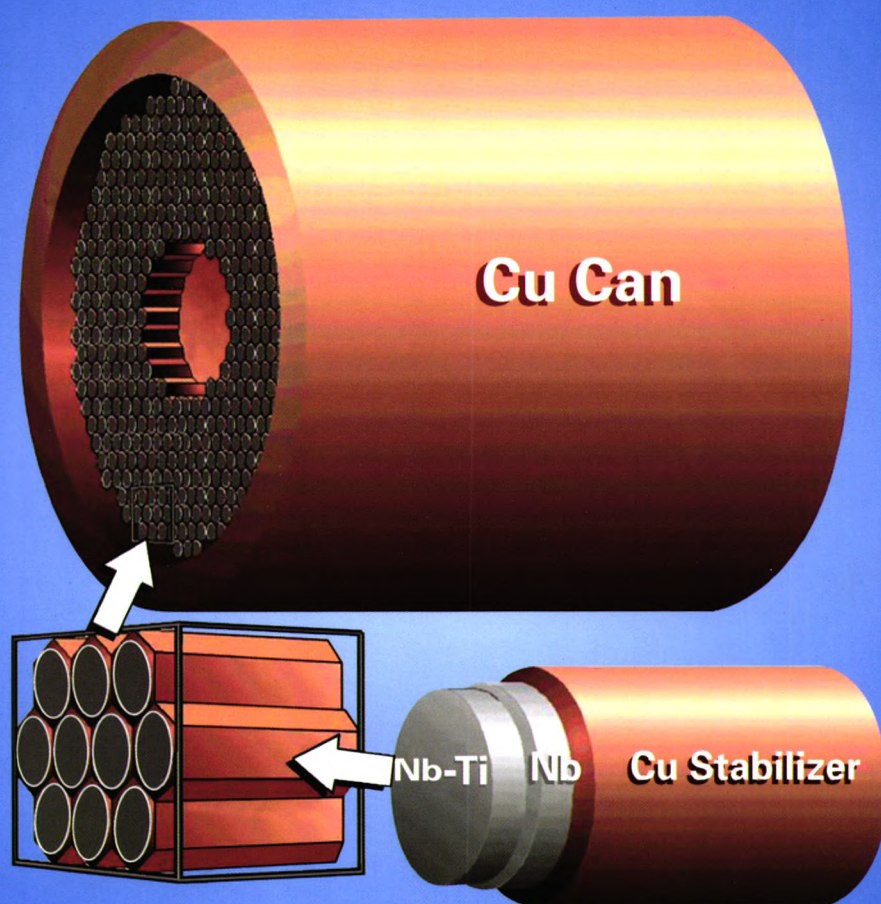


·教育部高等学校物理学与天文学教学指导委员会委托  
·吉林化工学院主办

ISSN 1007-2934

# 大学物理实验

PHYSICAL EXPERIMENT OF COLLEGE



ISSN 1007-2934



双月刊  
2012年

4

第25卷 第4期(总第95期)  
Vol.25 No.4(serial No.95)

# 大学物理实验

第 25 卷

2012 年第 4 期

(总第九十五期)

双月刊

ISSN1007-2934  
1CN22-1228/O<sub>4</sub>

广告经营许可证: 220200100029

主办单位: 吉林化工学院

出版单位: 《大学物理实验》编辑部

地 址: 吉林市承德街 45 号

邮 编: 132022

电 话: 0432-63083137

网 址:

<http://dwsj.chinajournal.net.cn>

电子信箱: [dwsj@chinajournal.net.cn](mailto:dwsj@chinajournal.net.cn)

印 刷: 吉林市地矿印刷厂

出版日期: 2012 年 8 月 26 日

## 编辑部

主 编: 丁 力

副 主 编: 王显德

本期责任编辑: 盖啸尘 刘立彦

齐丽晶 刘 艳

中文编辑: 张国范

英文编辑: 杨 雪

# 目 录

## PHYSICAL EXPERIMENT OF COLLEGE

教育部高等学校物理学与天文学教学指导委员会委托吉林化工学院主办

### 实验研究

基于光线追迹法的球形大粒子的多次散射计算

尹红伟, 张海良, 贾红辉, 等 (1)

基于新型磁阻传感器的地磁倾角测量 ..... 杨春振, 崔泽轮 (3)

利用 DISLab 温度传感器测金属比热容 ..... 翟林萍, 丁益民, 姚 亮, 等 (6)

利用地铁隧道风能发电的设计与研究 ..... 汪 浩, 张晓勇 (9)

广义洛伦兹磁力的定义及证明 ..... 曾清平 (14)

线阵 CCD 在声光调制实验中的应用 ..... 钱惠国, 吴 琼 (23)

超声波声速测量方法的探讨 ..... 李志杰, 赵 骞 (26)

新型路灯节能系统的设计 ..... 胡义冰, 陈 昊, 孙丽颖, 等 (29)

基于集成运放的太阳能控制器 ..... 蒋跃文 (32)

利用锁定放大器测量低电阻和高电阻 ..... 曹 文, 张利巍, 刘祥楼 (36)

放大系统在惠斯通电桥灵敏度研究中的应用 ..... 黄辉泽, 李龙静, 夏雪琴 (38)

菲涅尔透镜聚光对光伏发电效率的实验研究 ..... 王振飞, 杨 虹 (42)

傅立叶变换全息图的优化拍摄 ..... 张青兰, 武银兰 (45)

干涉现象中能量叠加的实验研究 ..... 柴学平, 杨超平 (49)

几何光学法和波动光学法测量液体折射率的比较

鲍 琳, 胡小飞, 张世功 (52)

基于计算机的电话拨号音的采集与分析 ..... 徐正兴, 田冰涛, 刘耀昌, 等 (55)

利用光杠杆测量微小位移的光路可视化研究与设计

池红岩, 王 鑫, 赵国臣 (58)

塞曼效应的层叠问题研究 ..... 贾翠红, 许雪娥 (60)

三平面镜成像实验规律初探 ..... 钱晓燕, 顾菊霞 (64)

双棱镜干涉测量的改进 ..... 刘丽群, 王明吉, 张利巍 (68)

新方法精确测量凸透镜焦距 ..... 陈 凯, 付雅辉, 王悦蕾 (71)

杨氏模量调节若干问题探讨 ..... 湛正良, 赵青生, 杨 名, 等 (74)

液体声速随温度变化的特性研究 ..... 薛 震, 刘 阳 (78)

用千分表测量金属丝的弹性模量 ..... 刘乔花, 王宛菁, 李 熊 (81)

用强度补偿式光纤传感器测液体体胀系数 ..... 孙明珠, 贾亚民 (84)

$l \gg d$  的圆柱体在黏性液体中的下落的探究

周 璐 (87)

### 计算机应用

非平衡电桥原理热敏电阻温度计的计算机校准与标定

侯胜益, 刘立英, 李 爽, 等 (90)

“热线法”测定气体热导率数据处理方法及 Origin 软件应用的探究

张孝栋, 夏雪琴 (92)

C 语言在测量气体热导率中的应用

张南山, 郭基洪, 芦立娟, 等 (95)

Origin 软件在大气光学实验中的应用研究 ..... 刘宪云, 杨亚军, 蒋美萍 (99)

基于 C# 的仿真示波器设计与实现 ..... 吴 芳, 吴凤凰, 刘桂玲 (101)

基于 MATLAB 的 RC 串联电路暂态过程仿真

罗志娟, 刘 敏, 易图林, 等 (105)

### 误差与数据处理

示波器的应用之振幅法声速测量暨两种数据处理方式的优化选择

郭 正 (108)

### 教学改革

大学普通物理实验的简化、深化和拓展探讨

盖双旗, 时 伟, 陈伟华, 等 (113)

浅识耗散结构理论对当代大学生创新的重要作用

蒋侠臣, 张 超, 张艳春, 等 (117)

大学物理演示实验网络教学管理平台构建与实施

林晓琬, 姜永恒, 白炳莲, 等 (120)

新材料、新技术在大学物理教学中的应用 ..... 唐军杰, 王爱军, 赵 昆 (123)

期刊基本参数: CN22-1228/O<sub>4</sub> \* 1987 \* b \* A4 \* 126 \* zh \* P \* ¥15.00 \* 1200 \* 37 \* 2012-08

## CONTENTS

|                                                                                                                                                  |                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Multiple-scatter Calculation of Large Spherical Particle Based on Ray-tracing Method                                                             | YIN Hong-wei, ZHANG Hai-liang, JIA Hong-hui, et al (1)     |
| Application of Magnetoresistive Sensors in Measuring the Geomagnetic Inclination                                                                 | YANG Chun-zhen, CUI Ze-lun (3)                             |
| Study on the Experiment of Specific Heat Capacity with Metals by Temperature Sensor                                                              | ZHAI Lin-ping, DING Yi-min, YAO Liang, et al (6)           |
| The Design and Research of Using the Subway Tunnel Wind Power                                                                                    | WANG Hao, ZHANG Xiao-yong (9)                              |
| Definition and Proof of Generalized Lorenz Magnetic                                                                                              | ZENG Qing-ping (14)                                        |
| Application of Line Array in Cousto-optic Modulation Experiment                                                                                  | QIAN Hui-guo, WU Qiong (23)                                |
| Discussion for Method of Measuring the Sound Velocity of Supersonic Wave                                                                         | LI Zhi-jie, ZHAO Qian (26)                                 |
| Design of the Novel Energy-saving Streetlight Control System                                                                                     | HU Yi-bing, CHEN Hao, SUN Li-ying, et al (29)              |
| A Case of Curriculum Development: Smart Solar Controller Based on OP-AMP                                                                         | JIANG Yue-wen (32)                                         |
| The Measurements of Low Resistance and High Resistance using Lock-in Amplifier                                                                   | CAO Wen, ZHANG Li-wei, LIU Xiang-lou (36)                  |
| Amplifying System in the Application in the Study of the Sensitivity of Wheatstone Bridge                                                        | HUANG Hui-ze, LILong-jing, XIA Xue-qin (38)                |
| The Experimental Study of Finel Lens Spotlight on the Photovoltaic Electricity Generation Efficiency                                             | WANG Zhen-fei, YANG Hong (42)                              |
| Optimized Shoot and Reconstruction of Fourier Transform Holography with Minitype Olographic Devices                                              | ZHANG Qing-lan, WU Yin-lan (45)                            |
| The Study on the Energy Superposition in the Interference Phenomenon                                                                             | CHAI Xue-ping, YANG Zhao-ping (49)                         |
| Comparison of Liquid Refractive Index by Geometrical and Fluctuation Optics Methods                                                              | BAO Lin, HU Xiao-fei, ZHANG Shi-gong (52)                  |
| The Acquisition and Analysis about DTMF Based on the PC                                                                                          | XU Zheng-xing, TIAN Bing-tao, LIU Yao-chang, et al (55)    |
| Visualization Design of the Optical Path of the Optical Lever for Measuring Small Displacement                                                   | CHI Hong-yan, WANG Xin, ZHAO Guo-chen (58)                 |
| Study on Zeeman Effect of Cascading Problems                                                                                                     | JIA Cui-hong, XU Xue-e (60)                                |
| A Research on the Law of the Triple-mirror Imaging                                                                                               | QIAN Xiao-yan, GU Ju-guan (64)                             |
| Improving the Biprism Interference Measurement                                                                                                   | LIU Li-qun, WANG Ming-ji, ZHANG Li-wei (68)                |
| A New Method for Accurately Measuring Convex Lens Focal Distance                                                                                 | CHEN Kai, FU Ya-hui, WANG Yue-lei (71)                     |
| Exploring Some Adjustment Problems in Young's Modulus                                                                                            | CHEN Zheng-gen, ZHAO Qing-sheng, YANG Ming, et al (74)     |
| Research on Characteristic of the Liquid Sonic Velocity Versus Temperature                                                                       | XUE Zhen, LIU Yang (78)                                    |
| Measurement for Elastic Modulus of Metal Wires by using Dial Indicator                                                                           | LIU Qiao-hua, WANG Wan-jing, LI Xiong (81)                 |
| Measuring the Coefficient of Volume Expansion of Liquid by Fiber-optical Sensor with Intensity Compensation Model                                | SUN Ming-zhu, JIA Ya-ming (84)                             |
| Research the Whereabouts of $L \gg d$ Cylinder in Viscous Liquid                                                                                 | ZHOU Jun (87)                                              |
| Standardization by Computer and Software of Thermo Sensitive Thermometer Based on Non-balanced Electric Bridge                                   | HOU Sheng-yi, LIU Li-ying, LI Shuang, et al (90)           |
| The Exploration of Data Processing Methods and Application of Origin Software for "Hot-wire Method" in Determination of Gas Thermal Conductivity | ZHANG Xiao-dong, XIA Xue-qing (92)                         |
| The Application of C Language in Measuring Gas Thermal Conductivity                                                                              | ZHANG Nan-shan, GUO Ji-hong, LU Li-juan, et al (95)        |
| Study on the Application of Origin Software in Atmospheric Optics Experiment                                                                     | LIU Xian-yun, YANG Ya-jun, JIANG Mei-ping (99)             |
| C# Based Design and Realization of Virtual Oscilloscope                                                                                          | WU Fang, WU Feng-huang, Liu Gui-ling (101)                 |
| Simulation of Transient Process of the RC Series Circuit Based on MATLAB                                                                         | LUO Zhi-juan, LIU Min, YI Tu-lin, et al (105)              |
| The Application of the Oscilloscope and the Velocity Measurement Based on the Amplitudelum Optimizing Selection of the Two Data Processing       | GUO Zheng (108)                                            |
| Simplify, Deepen and Expand in College Physical Experiment                                                                                       | GAI Shuang-qi, SHI Wei, CHEN Wei-hua, et al (113)          |
| Traceability Theory of Dissipative Structures-shallow Knowledge Innovation on the Important Role of College Students                             | JIANG Xia-chen, ZHANG Chao, ZHANG Yan-chun, et al (117)    |
| Building and Implementing Online Teaching Management Platform for University Physics Demonstration Experiment                                    | LIN Xiao-long, JIANG Yong-heng, BAI Bing-lian, et al (120) |
| Application of New Materials and New Technology in College Physics Teaching                                                                      | TANG Jun-jie, WANG Ai-jun, ZHAO Kun (123)                  |