



Q K 2 2 0 0 2 3 6

物理教学

2021.12

● 中国科学技术协会主管 ● 中国物理学会主办 ● 中国科协优秀期刊 ● 全国中文核心期刊

- 2021 年诺贝尔物理学奖解读: 复杂物理视角
- 大概念统摄下的高中物理单元教学设计与实践
——以“牛顿运动定律”教学为例
- 物理实践应用能力的评价设计
——以 2021 年无锡市物理中考第 27 题为例
- “磁感应强度”教学的方法失当及改进
- 美国近三十年高中物理教科书的习题设计及启示



<http://wljx.ecnu.edu.cn>

12
2021



物理教学

PHYSICS TEACHING

第43卷 第12期
(总第487期)
月刊(1978年创刊)

主管单位:中国科学技术协会
主办单位:中国物理学会
协办单位:上海市物理学会
出版单位:《物理教学》编辑部

主编:程亚
副主编:蒋最敏 刘玉鑫
管曙光 唐翠
编辑部主任:黄燕萍
封面题字:谢稚柳

目

录

●专论●	
2021年诺贝尔物理学奖解读:复杂物理视角	刘宗华(2)
●教学论坛●	
普通高中物理学科核心素养研究现状及趋势研究——基于《物理教学》期刊论文(2015—2020年)的内容分析	杨帆凡 许怡然 李春密(5)
在高中物理课堂显化臻美思维	白欣 王笑君(8)
大概念统摄下的高中物理单元教学设计与实践——以“牛顿运动定律”教学为例	戴小民(10)
“原子的核式结构模型”教学设计	张建国(14)
●物理实验室●	
巧设物理情境 助推深度学习——以“光电效应”教学为例	许湘苗(18)
物理实践应用能力的评价设计——以2021年无锡市物理中考第27题为例	顾炳峰 许帮正(22)
●教研巡礼:江苏●	
物理具身学习中的情境设计:情趣、境简、理深	浦建军(26)
融入创客教育理念 提升物理学科核心素养——以“互感与自感”教学为例	丁洪良(30)
物理学科核心素养视域下渗透科学思维教育初探——以“自由落体运动”教学为例	袁加兴(33)
●初中园地●	
优化教学路径 发展核心素养——以“阿基米德原理”的教学为例	任少锋(37)
“构建模型”在中考物理习题复习课中的应用——以“串联电路之变化量专题”复习为例	张玲(40)
●教研员论坛●	
“磁感应强度”教学的方法失当及改进	罗国忠(44)
●命题与解题●	
对一动态平衡问题的再思考——从学生的一次反问说起	王光宇(47)
追本溯源 破难之道——关于电磁感应中恒定磁场驱动下功率问题的求解	顾辉 王素云 饶华东(51)
对电磁波中E与B同步变化的证明	林辉庆(53)
●高考与竞赛●	
从一道竞赛题看磁聚焦——利用动态圆模型解磁聚焦问题	蔡泳茹 谢元栋(55)
涉及弹簧弹性势能一类问题的归类剖析	饶华东 王素云(59)
体验式教学:物理情景化试题的突破路径——以2021年广东省普通高中学业水平选择性考试物理科试题为例	周伟波 陈继红(63)
●国外教学●	
美国近三十年高中物理教科书的习题设计及启示	张恩德(67)
●生活与物理●	
对螺旋千斤顶工作原理的思考	李海龙(71)
●会议信息●	
第八届全国中学物理特级教师代表大会成功举办	编辑部(74)
2021年《物理教学》总目录	(75)

编辑部地址:上海市中山北路3663号
(华东师范大学物理与
电子科学学院内)
邮政编码:200062
电话(传真电话):(021)62232813
E-mail:wljx@phy.ecnu.edu.cn
网址:<http://wljx.ecnu.edu.cn>
排版:南京前锦排版服务有限公司

印刷:江苏省宜兴市德胜印刷有限公司
国内邮发代号:4-284
国内总发行:上海市报刊发行局
国外总发行:中国国际图书贸易集团
有限公司(北京399信箱)
国外发行代号:M356
发行方式:公开发行
订购处:全国各地邮局

国际标准连续出版物号:
ISSN:1002-0748
报刊代号:4-284
国内统一连续出版物号:
CN31-1033/G4
出版日期:2021年12月18日
国内定价:12.00元

ISSN 1002 - 0748

Physics Teaching

12

2021

Monthly

(Founded in 1978)

Vol. 43, No. 12

(Cumulative 487)

Sponsor:

Chinese Physical Society

Editor:

Editorial Board of
Physics Teaching,
Chinese Physical Society

Chief Editor:

Cheng Ya

Office:

3663 N. Zhongshan Road
Shanghai 200062
(East China Normal University)

Telephone:

86 - 21 - 62232813

Fax: 86 - 21 - 62232813

Email: wljx@phy.ecnu.edu.cn
http://wljx.ecnu.edu.cn

Distributor:

China International
Book Trading
Corporation(P. O. Box
399, Beijing)

Code Number:

M356

Date of Publication:

12 - 18 - 2021

ISSN 1002-0748



12>

9 771002 074214

Forum

Interpretation of the 2021 Nobel Prize in physics for perspectives of complex physics Liu Zonghua(2)

Teaching Forum

Research on core literacy in physics teaching based on content analysis of journal papers on Physics Teaching (2015 - 2020) ... Yang Fanfan, Xu Yiran, Li Chunmi(5)
To cultivate and beautiful thinking in physics classroom teaching Bai Xin, Wang Xiaojun(8)

Teaching design physics unit under the control of big concept, taking Newton's Law of motion as an example Dai Xiaomin(10)

Instructional design of nuclear structure model of atom Zhang Jianguo(14)

Physics Laboratory

Designing physics situations skillfully to boost deep learning, taking "photoelectric effect" teaching as an example Xu Xiangmiao(18)

Evaluation design of physics application ability, taking the 27th problem in 2021 Wuxi mid-exams as an example Gu Bingfeng, Xu Bangzheng(22)

Pilgrimage of Teaching Research: Jiangsu

The situation design in physics embodied learning is interesting, simple and profound Pu Jianjun(26)

Integrating the idea of Maker education to improve the core literacy of physics, taking the teaching of "mutual-perception and self-perception" as an example Ding Hongliang(30)

A preliminary study on the infiltration of scientific thinking education from the perspective of core literacy, taking the teaching of "free fall" as an example Yuan Jiaxing(33)

Junior Physics

Optimizing the teaching path to develop the core quality, taking the teaching of "Archimedes principle" as an example Ren Shaoduo(37)

The application of "constructing model" in review lesson, taking the review of series circuit as an example Zhang Ling(40)

Education Inspectors Forum

Improper teaching method of "magnetic induction intensity" and its improvement Luo Guozhong(44)

Questions Assigned and Solved

Thinking again a dynamic balance problem Wang Guangyu(47)

The solution of power problems driven by constant magnetic field in electromagnetic induction Yan Hui, Wang Suyun, Rao Huadong(51)

Proof of synchronous change of E and B in electromagnetic wave Lin Huiqing(53)

High-Exams and Competition

A study of magnetic focusing from a competition problem and its solving magnetic focusing problem with dynamic circle model Cai Yongru, Xie Yuandong(55)

Classification and analysis of a class of problems involving spring elastic potential energy Rao Huadong, Wang Suyun(59)

A breakthrough path of physics situational test questions, a case study of the physics test questions of Guangdong high-exams in 2021 Zhou Weibo, Chen Jihong(63)

Teaching Abroad

The design of exercises in American high school physics textbooks in recent thirty years and its enlightenment Zhang Ende(67)

Physics in Daily Life

Thinking about the working principle of screw jack Li Hailong(71)

Meeting Information

The 8th national middle school physics teachers' congress was successfully held editorial(74)

Total contents of the year 2021 of "Physics Teaching" (75)

ISSN 1002 - 0748

Physics Teaching

12

2021

Monthly

(Founded in 1978)

Vol. 43, No. 12

(Cumulative 487)

Sponsor:

Chinese Physical Society

Editor:

Editorial Board of
Physics Teaching,
Chinese Physical Society

Chief Editor:

Cheng Ya

Office:

3663 N. Zhongshan Road
Shanghai 200062
(East China Normal University)

Telephone:

86 - 21 - 62232813

Fax: 86 - 21 - 62232813

Email: wljx@phy.ecnu.edu.cn
http://wljx.ecnu.edu.cn

Distributor:

China International
Book Trading
Corporation(P. O. Box
399, Beijing)

Code Number:

M356

Date of Publication:

12 - 18 - 2021

ISSN 1002-0748



12>

9 771002 074214

Forum

Interpretation of the 2021 Nobel Prize in physics for perspectives of complex physics Liu Zonghua(2)

Teaching Forum

Research on core literacy in physics teaching based on content analysis of journal papers on Physics Teaching (2015 - 2020) ... Yang Fanfan, Xu Yiran, Li Chunmi(5)
To cultivate and beautiful thinking in physics classroom teaching Bai Xin, Wang Xiaojun(8)

Teaching design physics unit under the control of big concept, taking Newton's Law of motion as an example Dai Xiaomin(10)

Instructional design of nuclear structure model of atom Zhang Jianguo(14)

Physics Laboratory

Designing physics situations skillfully to boost deep learning, taking "photoelectric effect" teaching as an example Xu Xiangmiao(18)

Evaluation design of physics application ability, taking the 27th problem in 2021 Wuxi mid-exams as an example Gu Bingfeng, Xu Bangzheng(22)

Pilgrimage of Teaching Research: Jiangsu

The situation design in physics embodied learning is interesting, simple and profound Pu Jianjun(26)

Integrating the idea of Maker education to improve the core literacy of physics, taking the teaching of "mutual-perception and self-perception" as an example Ding Hongliang(30)

A preliminary study on the infiltration of scientific thinking education from the perspective of core literacy, taking the teaching of "free fall" as an example Yuan Jiaxing(33)

Junior Physics

Optimizing the teaching path to develop the core quality, taking the teaching of "Archimedes principle" as an example Ren Shaoduo(37)

The application of "constructing model" in review lesson, taking the review of series circuit as an example Zhang Ling(40)

Education Inspectors Forum

Improper teaching method of "magnetic induction intensity" and its improvement Luo Guozhong(44)

Questions Assigned and Solved

Thinking again a dynamic balance problem Wang Guangyu(47)

The solution of power problems driven by constant magnetic field in electromagnetic induction Yan Hui, Wang Suyun, Rao Huadong(51)

Proof of synchronous change of E and B in electromagnetic wave Lin Huiqing(53)

High-Exams and Competition

A study of magnetic focusing from a competition problem and its solving magnetic focusing problem with dynamic circle model Cai Yongru, Xie Yuandong(55)

Classification and analysis of a class of problems involving spring elastic potential energy Rao Huadong, Wang Suyun(59)

A breakthrough path of physics situational test questions, a case study of the physics test questions of Guangdong high-exams in 2021 Zhou Weibo, Chen Jihong(63)

Teaching Abroad

The design of exercises in American high school physics textbooks in recent thirty years and its enlightenment Zhang Ende(67)

Physics in Daily Life

Thinking about the working principle of screw jack Li Hailong(71)

Meeting Information

The 8th national middle school physics teachers' congress was successfully held editorial(74)

Total contents of the year 2021 of "Physics Teaching" (75)