

# 力学与实践

MECHANICS IN ENGINEERING

ISSN 1000-0879

CN 11-2064/O3

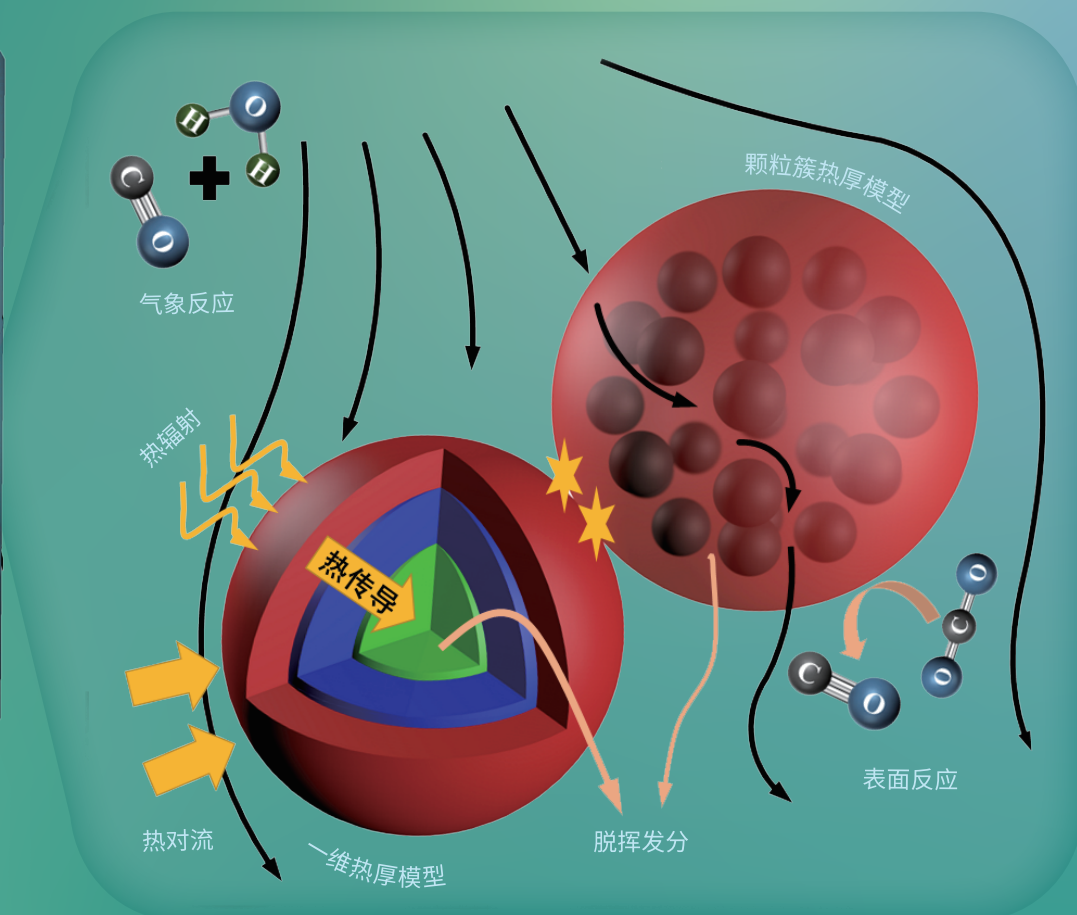
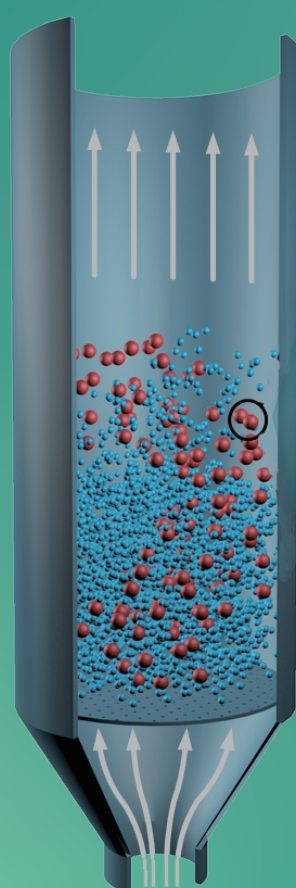
Scopus数据库收录

中文核心期刊

中文科技核心期刊

- ◎ 库晓珂等:生物质热化学转化的CFD模拟研究
- ◎ 曾祥远等:小行星 2016 HO3 表面动力学环境分析及采样挑战
- ◎ 叶志明等:论教书育人与课程思政之关系

第 43 卷  
2021 5



中国科学院力学研究所  
中国力学学会  
力学与实践 期刊社

主办  
出版

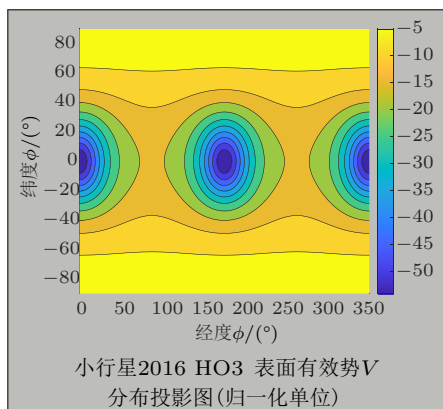
## 目 次

### 专题综述

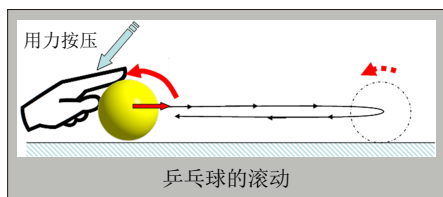
- 663 生物质热化学转化的 CFD 模拟研究  
库晓珂, 王金, 陈涛, 张润辉

### 应用研究

- 674 小行星 2016 HO3 表面动力学环境分析及采样挑战  
张永隆, 闫脩然, 李俊峰, 曾祥远
- 680 大型低轨星座自适应绝对站位保持法  
孙俞, 曹静, 伍升钢, 何雨帆
- 687 基于三维重构的冻融岩石细观损伤研究  
张慧梅, 慕娜娜
- 695 低加载应变率下页岩力学特性试验研究  
徐恒威, 尹彬瑞, 李军润, 刘俊新, 唐伟, 张可
- 702 新型输电导线内嵌式接续管振动疲劳响应特性及试验分析  
张仁奇, 祝贺, 张义钊, 邢宏超, 袁鸣, 廖汉梁, 朱金福
- 712 基于理想弹塑性假定的滚石冲击力计算方法研究  
黄连芬, 李瑞园
- 722 加肋箱型长杆极限承载力实验研究  
王永宝, 贾靖焄, 张脩, 高阳, 占玉林
- 728 变截面连续箱梁桥剪力滞效应的有限梁段法分析  
赵志, 张鹏飞, 张元海
- 734 柱状颗粒在线性剪切流场中运动的数值模拟研究  
郑乐梅, 王彦入, 沈家鑫, 尹招琴, 包福兵
- 740 主应力及其方向余弦和极值切应力方向余弦计算的补遗  
王凯



P674



P753

### 教育研究

- 744 论教书育人与课程思政之关系  
叶志明, 王骞, 陈伶俐
- 748 工字型截面弯曲切应力分布辨析  
李敏, 李芷菡, 陈伟民
- 753 Matlab 求解理论力学问题系列 (四) 乒乓球的滚动  
高云峰

- 760 增材制造技术发展对飞机结构设计教学的影响  
张纪奎, 秦韶成, 程小全, 邴正能
- 766 三线摆测刚体转动惯量: 实验改进与教学体会  
李华锋, 商宏学, 王永
- 771 基于图像分析的质心和转动惯量测量方法  
李凯, 周璟成
- 776 实时三维数字图像相关方法在材料力学教学中的应用  
邵新星, 陈捷, 马沁巍, 何小元
- 783 固-液界面摩擦阻力测量方法研究  
李晨阳, 徐献忠
- 789 欧拉弹性线问题的 Maple 数值模拟  
李银山, 孙博华
- 796 土木类专业流体力学课程教学改革与实践  
梅真



空客增材制造拓扑优化机翼支架结构

P760

## 力学纵横

### 身边力学的趣话

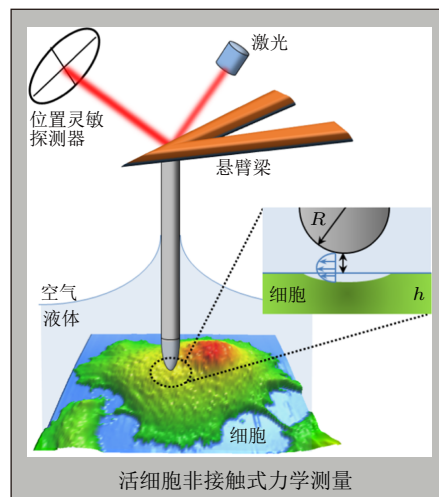
- 801 由一张 A4 纸引发的思考  
黄可, 郭昱均, 郝泱, 李栋栋, 范钦珊
- 806 探索微纳米世界的手——原子力显微镜  
李航宇, 聂鹏程, 关东石

### 全国周培源大学生力学竞赛

- 812 第十三届全国周培源大学生力学竞赛(个人赛) 试题  
点评  
高云峰, 庄茁

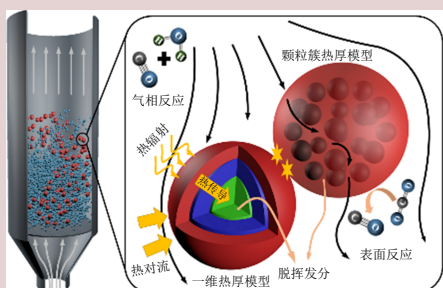
### 书刊评介

- 821 当力学遇到研究生教育研究——《研究生教育动力学》评介  
董渊
- 823 陈耀松教授的办刊之道  
刘志远, 陈岩



活细胞非接触式力学测量

P806



**封面故事** 生物质具有低碳、可再生、可产油产气等优点, 是未来化石能源的重要替代品之一。封面图从颗粒多相流计算流体力学 (computational fluid dynamics, CFD) 建模的视角, 示意了生物质颗粒在反应器内的运动和转化过程。热转化时, 生物质颗粒会经历干燥、热解、炭消耗等阶段。颗粒温度对其转化至关重要, 针对小尺寸颗粒, 大多采用热薄模型。但当尺寸较大时, 颗粒内部会存在温度梯度, 此时可采用一维分层或多维

颗粒簇热厚模型进行解析。颗粒和流体间的交互包括空间体积的两相竞争、相间动量交换和热质传输。未来, 针对生物质颗粒的不规则形状、生物质灰分催化活性、气体颗粒污染物等方面, 可进一步完善和优化现有的 CFD 模型。(图文供稿: 库晓珂, 浙江大学航空航天学院)

## CONTENTS

## Review

- CFD studies of biomass thermochemical conversion..... KU Xiaoke WANG Jin CHEN Tao ZHANG Runhui (663)

## Applied Research

- The analysis of surface dynamical environments and sampling difficulties for asteroid 2016 HO3..... ZHANG Yonglong YAN Xiaoran LI Junfeng ZENG Xiangyuan (674)
- Adaptive absolute station-keeping method for LEO mega-constellation..... SUN Yu CAO Jing WU Shenggang HE Yufan (680)
- Study on meso-damage of freeze-thaw rocks based on 3D reconstruction..... ZHANG Huimei MU Nana (687)
- Experimental research on mechanics characteristics of shale under different loading strain rates..... XU Hengwei YIN Binrui LI Junrun LIU Junxin TANG Wei ZHANG Ke (695)
- Vibration fatigue response characteristics and experimental analysis of a new type of inline jacket for transmission conductors..... ZHANG Renqi ZHU He ZHANG Yizhao XING Hongchao YUAN Ming LIAO Hanliang ZHU Jinfu (702)
- Research on a calculation method of rolling stone impact force based on ideal elastic-plastic hypothesis..... HUANG Lianfen LI Ruiyuan (712)
- Experimental study on ultimate capacity of box stiffened box under compression..... WANG Yongbao JIA Jingyao ZHANG Xiao GAO Yang ZHAN Yulin (722)
- Finite segment method for analyzing shear lag effect of continuous box girder bridge with variable cross section..... ZHAO Zhi ZHANG Pengfei ZHANG Yuanhai (728)
- Numerical simulation research on the movement of a cylindrical particle in a linear shear flow..... ZHENG Lemei WANG Yanru SHEN Jiaxin YIN Zhaoqin BAO Fubing (734)
- Supplement to the calculation of principal stresses, their direction cosines and direction cosines of extreme shear stresses..... WANG Kai (740)

## Research on Education

- On the relationship between the course education and imparting knowledge and cultivating people..... YE Zhiming WANG Qian CHEN Lingli (744)
- The distribution of bending shear stress in I-shaped section..... LI Min LI Zhihan CHEN Weimin (748)
- The roll of a table tennis..... GAO Yunfeng (753)
- Influence of additive manufacturing technology development on aircraft structure design teaching..... ZHANG Jikui QIN Shaocheng CHENG Xiaoquan LI Zhengneng (760)
- Three-wire pendulum to measure the moment of inertia of a rigid body: experimental improvement and teaching experience..... LI Huafeng SHANG Hongxue WANG Yong (766)
- Center of mass and moment of inertia measurement method based on image analysis..... LI Kai ZHOU Jingcheng (771)
- Application of real-time 3D-DIC method in teaching material mechanics..... SHAO Xinxing CHEN Jie MA Qinwei HE Xiaoyuan (776)
- Research on measuring method of friction resistance of solid-liquid interface... LI Chenyang XU Xianzhong (783)
- Numerical simulation of Euler elastic line problem with Maple..... LI Yinshan SUN Bohua (789)
- Reform and practice of teaching fluid mechanics for civil engineering..... MEI Zhen (796)

## The Field of Mechanics

## On mechanics around us

- Inspiration of a sheet of A4 paper... HUANG Ke GUO Yujun HAO Yang LI Dongdong FAN Qinshan (801)
- A hand of exploring the micro- and nano-scale world — atomic force microscope..... LI Hangyu NIE Pengcheng GUAN Dongshi (806)

## National Zhou Peiyuan Competition on Mechanics

- Comments on questions of the 13th Zhou Peiyuan Mechanics Competition (for individual events)..... GAO Yunfeng ZHUANG Zhuo (812)

## Book review

- When mechanics meet graduate education research..... DONG yuan (821)
- Professor Chen Yaosong's approach of running journals..... LIU Zhiyuan CHEN Yan (823)