

1st International Conference on Fluid Dynamics and Computational Science (FDCS 2022)

Journal of Physics: Conference Series Volume 2441

Chengdu, China
12-13 November 2022

ISBN: 978-1-7138-7155-2
ISSN: 1742-6588

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

This work is licensed under a Creative Commons Attribution 3.0 International Licence.
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2023)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

The analysis on the flow characteristics of supersonic inlet considering structural vibration	1
<i>Bing Chen, Hongyang Chen, Tao Mo, Shenshen Liu, Hongyin Jia</i>	
The impact of inlet mach number and domain shape on subsonic nozzle flow via small disturbance equation	11
<i>Xuehui Qian</i>	
The effects of geometry parameters on the aerodynamic performance of CFJ airfoil used by a STOL transport	20
<i>Cheng Chen, Zhengyao Xie, Chengjun He, Xian Chen, Jiangtao Huang</i>	
Numerical Simulation of Flow Over Airfoil and Its Optimization	27
<i>Rick E. Xu, Zhe Wu</i>	
Research on the pressure distribution under different airfoil types of aircraft.....	38
<i>Xinying Chen, Xinyu Cheng, Junlu Tian</i>	
Aerodynamic optimization analysis of the front bumper side of the vehicle	46
<i>Bingheng Wu, Lin Chen, Qingyun Guan, Ling Xiao, Xiayi Yuan</i>	
Numerical Simulation of the Two-phase Flow of a Constant-pressure Rear-spray Low Recoil Weapon with Two Chambers.....	53
<i>Zijian Li, Ming Qiu, Jie Song, Liang Yang, Zhenqiang Liao</i>	
Numerical Simulation of External Flow-Field of a Car Body Based on CFD.....	59
<i>Dan Zhao</i>	
Study on the influence of aerodynamic configuration on vortex vibration of steel pipe	65
<i>Guo Huang, Xiaojun Li, Xiang Xia</i>	
The Effects of Roadside Buildings Roof Shapes and Tree Plantings on the Vehicle Exhaust Gas Pollution Dispersion in the Urban Street	71
<i>Frances Hsu, Ajanae Bennett</i>	
Research on Fast CFD Simulation of Automobile Flow Field Based on Artificial Intelligence.....	78
<i>Xiaofeng Cao, Qiang Wang, Hongyan Li, Hai Ma</i>	
Research on turbulence model for simulation of wind flow in mountain areas of micro-topography.....	85
<i>Yuan Yin, Yangsen Li, Ruizong Lin, Zhiwei Liu, Benzhao Fu, Guo Huang, Hongjie Zhang</i>	
Investigation on Shallow Trenched-Hole Film Cooling Effectiveness at Turbine Blade Pressure Side.....	90
<i>Jiangjiang Yin, Kenan Huang, Ying Huang</i>	
Numerical Evaluation on Effects of Upstream Sand-Dune-Shaped Ramp and Backward Coolant Injection on Heat Transfer	97
<i>Yanni Deng, Liang Yu, Ying Huang, Shengchang Zhang</i>	
Numerical study of different micro-channel structures on fluid flow and heat transfer performance	106
<i>Zijian Chen</i>	
Studying the effect of geometry of micro-cavity on pool boiling by LBM.....	118
<i>Qiang Huang, Jingzhi Zhou, Xiulan Huai, Feng Zhou</i>	

Study of low-level pool boiling in vapor chamber of wickless micro-heat pipe based on Lattice Boltzmann pseudopotential method—Effects of superheat and wall wettability	125
<i>Shalong Xiong, Yanping Du, Rui Wu</i>	
Multi-objective Topology Optimization of the Temperature Field Considering the Material Nonlinearities	138
<i>Guyang Li, Lin Li, Zhigang Peng, Sanbao Hu</i>	
The Application of Boundary Element Method for The Solution of The Inverse Heat Conduction	149
<i>Jin Wen, Ziyang Xiang, Longlong Li, Yulu Zhang, Huili Yan, Yi Zhu</i>	
Numerical simulation of two-phase evaporation and condensation	159
<i>Wei Chang, Fangju Zhang, Kun Fang, Gongli Tan, Pengjie Fan</i>	
Examination of Star Formation Rate enhancement in galaxy pairs selected based on data from Illustris TNG.....	163
<i>Yiru Chen</i>	
Comparison of different models for gravitational and electromagnetic radiation of binary neutron star mergers	171
<i>Boyang Sun</i>	
Approximation properties of some Bernstein-Schurer type operators.....	186
<i>Boyong Lian</i>	
Acoustic Field Prediction Method and Simulation Research Based on Acoustic Field Geometric Average Theory	190
<i>Xianwen He, Zhizhong Li, Junping Sun</i>	
The impact of the dark matter on galaxy formation	198
<i>Junwen Diao, Shibiao Wei, Zherui Wei, Chang Liu</i>	
Mass Function and Density Profile of Dark Matter Halos in Illustris-TNG.....	206
<i>Haichen Fan, Lu Lu, Jianyuan Luo, Jiakuan Wang</i>	
Differences among IllustrisTNG series and a Brief Comparison with the Illustris Project.....	212
<i>Zhengyu Dai, Jinao Dong, Runyu Liao, Qiwei Yue</i>	
Investigation of neutral hydrogen distribution and neutral hydrogen halo mass relation based on IllustrisTNG50.....	221
<i>Yanlin Wu</i>	
Main Sequence and Quenching of Star Formation based on Simulations from IllustrisTNG	228
<i>Xinen Zhou</i>	
Extrasolar Planet Candidates Identified by Single Transit from TESS.....	233
<i>Zhixin Wang</i>	
Soliton solution to the time-like curve shortening flow in the pseudo-sphere.....	248
<i>Jinwei Chang, Yuyan Wang, Nan Zeng, Yanhua Yu</i>	
The Progress of Investigation on Neutrino Properties.....	253
<i>Taoshan Sheng, Shitao Qu, Chenghao Qian</i>	
Black hole growth at early universe: impact of angular momentum of supplied gas	262
<i>Chenyu Liu, Jingzhou Qiu</i>	

Application of CVOFLS method in multi vortex shear flow field	273
<i>Liyang Cui, Yingge Yang, Cuiping Ren</i>	
Morphology of Broad Emission Lines from Binary Supermassive Blackholes	277
<i>Hongyi Xiong, Peng Jiang</i>	
The wave-particle interactions between chorus waves and electrons in the Earth radiation belts.....	295
<i>Yijia Wang</i>	
A Numerical Investigation of Tidal Disruption Rate Enhancement in Post-Starburst galaxies.....	307
<i>Marco Tinjeung Xue, Fuguo Xie</i>	
Research on Atmospheric Turbulence Distortion Measurement Based on Compressed Sensing Technology	321
<i>Kaichen Huang, Hengliang Deng, Yanlong Lin</i>	
Method of using theodolite's observation data of fixed star to evaluate INS's attitude accuracy based on time-delay compensation.....	330
<i>Xianglong Kong, Chenghao Liu, Xingcun Wu, Kecheng Liu, Junhao Liang</i>	
Effect of collision of particles on migration behaviour in hydrocyclone.....	335
<i>Yang Gao, Xiaohan Pei, Gang Cao, Jiaqing Yu, Xiaojie Zhao, Feng Li</i>	
Longitudinal stability analysis of underwater towed body based on CFD	342
<i>Xianlong Liu, Cheng Liu, Cheng Chen, Haixing Kui</i>	
Frequency Analysis of Submerged Cylindrical Shell near the Rigid Wall with Hydrostatic Pressure	348
<i>Peng Wang, Qingyong Niu, Hao Zhang</i>	
Simulation study on active cavitation suppression for a typical hydrofoil	353
<i>Yun Wang, Liang Dong, Jianwei Wu, Zhijian Li, Wei Wang</i>	
Prediction on the axial water thrust characteristics of pump turbine runner under partial load.....	363
<i>Jianqiang Guo, Huili Bi, Guohu Luo, Zhengwei Wang</i>	
Simulation study on passive cavitation suppression for a typical hydrofoil.....	369
<i>Jinlan Zhang, Yun Wang, Liang Dong, Jianwei Wu, Wei Wang, Zhijian Li</i>	
An investigation of flow characteristics between different mediums.....	379
<i>Zihan Wang, Yulong Yi, Siyuan Yin</i>	
Numerical simulation of steam flooding in offshore heavy oil reservoir after water flooding.....	387
<i>Qingquan Zhang, Xiaofei Sun</i>	
CFD analysis and prediction of centrifugal pump cavitation performance based on three- dimensional two-phase flow between impeller and worm gear.....	392
<i>Shi Ma, You Liu</i>	
Water Hammer Protection Measures and Calculation Analysis of Reservoir Water Pipelines.....	399
<i>Sen Xu, Xiaolong Zhu, Yiwu Tan, Chuping Chen</i>	
Analysis of flow resistance characteristics of solenoid valve based on numerical simulation	405
<i>Zhengjiang Wu, Wei Xia, Yuexia Fan, Chenhui Li, Baoping Zeng</i>	
Research in Velocity Profile and Pressure Distribution in 2D Conduit Flow with Stagger Arranged liquid separator blocks.....	412
<i>Feiyang Ou</i>	

Coupled double-distribution-function lattice Boltzmann model with streaming-collision process.....	422
<i>Zhuojie He, Ruifang Liang</i>	
Dynamic Load Analysis of an Centrifugal Pump Axle using FSI Simulation.....	429
<i>Biaohua Cai, Zheng Zhang, Yinzhong Chen, Zhou Tang</i>	
Research on the Arrangement Process of Marine Submersible Buoy System based on Computational Fluid Dynamics.....	435
<i>Xiaohan Chen</i>	
High-Resolution Hemodynamic Analysis of a Wearable Oxygenator Using High-Performance Computing.....	441
<i>Wei Chen, Rongliang Chen</i>	
Layout of measuring points for flue gas flow velocity in coal-fired power plants based on CFD technology.....	453
<i>Junhao Wu, Chunling Liu</i>	
Design and Fluid Analysis of a Novel Power Supply Unit for Unmanned Marine Equipment.....	461
<i>Changlei Wang, Zhongyue Lu, Zirong Luo, Mangkuan Wang</i>	
Underway Conductivity-Temperature-Depth profiler system cable force analysis and vortex vibration phenomenon research.....	469
<i>Libin Du, Chen Liu, Jie Liu, Ding Gao</i>	
Research on wind direction measurement of wind turbine based on fluid simulation.....	480
<i>Na Ren, Guangwei Zhu, Shaonan Fu, Xiaocong He, Jianbin Hu, Yangguang Zhu</i>	
Analysis of fluid excited noise characteristics of bulkhead opening of an Underwater Unmanned Vehicle.....	486
<i>Zhengjiang Wu, Chao Xiang, Junhua Hu, Baoping Zeng</i>	
Experimental study on Velocity Distribution in Rod Bundle Channels under Flow Fluctuation.....	495
<i>Xing Li, Hui Wang, Qianglong Wang, Jinrong Qiu, Sichao Tan</i>	
Numerical simulation of gas-liquid interface in high-pressure water-blowing chamber.....	500
<i>Xionghui Tang, Yiyou Liu</i>	
A method for calculating the void fraction of two-phase leakage ports of storage tanks.....	507
<i>Jiajia Ma, Min Hua</i>	
Simulation of the dynamic behavior of droplet impact on the microstructure surface.....	512
<i>Jianhua Yang, Ming Gao, Hailin Sun, Zhennan Liu, Kaiyuan Zhang</i>	
Modeling of Micro-downburst accompanied with rain and analysis of its influence on artillery firing accuracy.....	520
<i>Jin Wang, Junwei Tian, Zhen Zhang, Xiaoming Lei, Guangyu Sun, Xiaodan Guo</i>	
Thermal fluid lubrication analysis of hydrodynamic journal bearing based on mass conservation boundary conditions.....	529
<i>Xinliang Hu, Kaiping Yu, Junxiong Zhang</i>	
Analysis of Dynamic Performance of Synchronous Double Proportional Valve Based on Digital Simulation.....	536
<i>Biaohua Cai, Maosen Zhang, Qiuxu Hu, Zheng Zhang, Zhaocun Shi</i>	

Bubble formation by shearing-to-squeezing transition in a T-junction..... 543

Yu Han

A CFD-based study of twin-screw expander performance and inlet structure optimization 550

Shuai Lin

Author Index