

JIANHUI ZHANG

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EDUCATION

Tsinghua University (985/211)	Beijing, China
<ul style="list-style-type: none">MPhil in Power Engineering and Engineering ThermodynamicsGPA: 3.3/4	September 2017-June 2020
North China Electric Power University (211)	Beijing, China
<ul style="list-style-type: none">BEng in Energy and Power EngineeringGPA: 90/100 (rank 1/30, Excellent Engineer Practice Class)National Scholarship (top 1% of University students)	September 2013-June 2017 2014-2015

Main Undergraduate Courses (full score 100)

Advanced Mathematics 1, 2	98, 95	Advanced Language Programming(C)	100	College Physics 1, 2	90, 94
Engineering Thermodynamics	93	Engineering Fluid Mechanics	93	Heat Transfer	98
Electronic Technology	94	Automatic Control Theory	98	Electrotechnics	92
Material Mechanics	98	Theoretical Mechanics	95	Graduation Project	98

RESEARCH EXPERIENCE

North China Electric Power University	Beijing, China
Research Assistant to Lei Wang, Professor of Department of Mathematics and Physics	September 2015-June 2016

Nonlinear Wave and Modulational Instability of Nonlinear Schrödinger Equations

- Derived analytic solutions of nonlinear waves (breather, rogue wave and semirational solution) on constant backgrounds of the higher-order generalized nonlinear Schrödinger equation describing the propagation of ultrashort optical pulse in optical fibers
- Presented the explicit conditions for the transitions between breathers and solitons with different structures
- Revealed the explicit relation between the transition and the distribution characteristics of the modulation instability (linear stability analysis) growth rate
- Derived the superregular breather solution that develops from a small localized perturbation, which provide helpful insight on the nonlinear stage of modulation instability with the higher-order effects

Tsinghua University (Key Laboratory of Thermal Science and Power Engineering, Ministry of Education)	China
Graduate student to Haiying Qi, Dean of Institute of thermal engineering	September 2017-June 2020

Control Mechanism of Microjet in Gas Turbine Combustion Chamber (thesis topic)

- Numerical simulation (Reynold-averaged Navier-Stokes equations) of cold flow field in conical swirler to study the formation mechanism of a specific recirculation zone structure with microjet, which is helpful for combustion stability and flameout limit in combustion chamber
- Machine Learning, including the naive gaussian process regression method, will be used to establish the substitution model based on the simulation data and help achieve the microjet control strategy

Other Works:

- Developed a solver about Partial-averaged-based turbulence model based on OpenFOAM software
- Accomplished the investigation and a review paper on supercritical CO₂-Allam cycle and combustion
- Participated in Chinese Gas Turbine Major Project and 300MW gas turbine combustor nozzle test, provided uniform criterion for ignition test based on the accomplishment of database and analysis, developed semianalytical correlations for NO_x and CO emissions

Tsinghua University-University of Waterloo Joint Research Center for Micro/Nano Energy & Environment Technology
Beijing, China

Research Assistant to Qinghai Li during winter vacation

December 2018-February 2019

The interactions of biomass and polymers during co-pyrolysis

- Investigated the interactions among biomass (tobacco stalk) and typical polymers (scrap tire, polypropylene and polyvinyl chloride) during co-pyrolysis using Thermogravimetric analyzer coupled with Fourier transform infrared spectrometer
- Calculated the overlap ratio of thermogravimetric curves to evaluate the interaction quantitatively
- Conducted the kinetic analysis to present the main decomposition stage based on first-order reaction model

WORK EXPERIENCE

Contemporary Amperex Technology Co. Limited	Intern	Fujian, China	July 2018
<ul style="list-style-type: none">• Learned the whole process of the design, manufacturing and testing of lithium battery• Conducted research on the development status of power battery and energy storage technology			
Pansan Power Plants of Wanjiang Logistics Group Co. LTD	Intern	Anhui, China	February 2014
<ul style="list-style-type: none">• Learned the electric generation process of circulating fluidized bed boiler• Won Social Practice Advanced Individual in North China Electric Power University			

PUBLICATIONS

1. **J. Zhang**, L. Wang & C. Liu: Superregular Breathers, Characteristics of Nonlinear Stage of Modulation Instability induced by Higher-order Effects, *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 473.2199 (2017): 20160681 (ESI highly cited paper)
2. L. Wang, **J. Zhang**, Z. Wang, et al.: Breather-to-soliton Transitions, Nonlinear Wave Interactions, and Modulational Instability in a Higher-order Generalized Nonlinear Schrödinger Equation, *Physical Review E*, 93.1 (2016): 012214 (ESI highly cited paper)
3. L. Wang, **J. Zhang**, C. Liu, et al.: Breather Transition Dynamics, Peregrine Combs and Walls, and Modulation Instability in a Variable-coefficient Nonlinear Schrödinger Equation with Higher-order Effects, *Physical Review E*, 93.6 (2016): 062217 (ESI highly cited paper)
4. **J. Zhang**, H. Qi: Research Development on Supercritical CO₂-Allam Cycle and Combustion, (in Chinese), Oral Presentation at 2018 Conference of Chinese Society of Engineering Thermodynamics, published by *Proceedings of the Chinese Society for Electrical Engineering* (DOI: 10.13334/j.0258-8013.pcsee.181919)
5. R. Chen, **J. Zhang**, L. Lun, et al.: Comparative Study on Synergistic Effects in Co-pyrolysis of Tobacco Stalk with Polymer Wastes: Thermal Behavior, Gas Formation, and Kinetics, *Bioresource Technology* (accepted)

HONORS & AWARDS

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| • School First Scholarship for 2013-2015 academic year (top 3%) | November 2014 |
| • National Scholarship for 2014-2015 academic year (top 1%) | November 2015 |
| • Outstanding graduate of Beijing | June 2017 |
| • National Third Prize, 31st China Undergraduate Physics Tournament (Non-physical class A) | December 2014 |
| • National Third Prize, 9th National University Student Contest on Energy Saving and Emission Reduction | September 2015 |
| • National Third Prize, 7th National Mathematics Competition for College Student | October 2015 |
| • First Prize, 8th Mechanical Innovation Design Competition for College Student in Beijing | March 2016 |
| • Honorable Mention, Mathematical Contest in Modeling | March 2016 |

ADDITIONAL INFORMATION

Extracurricular Experiences

- Guest student in Prof Minfang Han's SOFC group in Tsinghua university May 2019-July 2019
- Teaching assistant of Complex Variables Functions in Tsinghua university September 2018-January 2019
- Doctoral Students Lecturer Group in Tsinghua university September 2018-June 2019
 - Organized 4 large lecture activities covering 560 college students about the topic of "energy industry development during reform and opening up in China"
- "Natural Gas Shortage Exploration" social practice in Baoding, Hebei January 2019
 - Conducted investigation on "coal to gas" project—a clean heating project in Baoding—through visits and field research, and assessed the possibility of the utilization of clean coal combined with biomass energy in remote countryside which suffered from the expensive price of natural gas
 - won the gold medal of 2018 winter vacation employment practice for graduate students in Tsinghua university

Computer Skills

- Software: ANSYS, OpenFOAM, LAMMPS, AutoCAD, Origin, MS Office
- Coding: Fortran, MATLAB, C/C++, R, Mathematica

Languages

- Chinese (Native), English (IELTS 6.5)