

汽车工程系

DEPARTMENT OF AUTOMOTIVE ENGINEERING

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郑新前, 中国青年科技奖获得者, 清华大学特别研究员(长聘)、博士生导师, 普林斯顿大学访问学者, ASME Journal of Engineering for Gas Turbines and Power副主编, Aerospace Science and Technology副主编。面向国家重大需求和国际学术前沿, 长期从事航空涡轮发动机和涡轮增压内燃机研究, 主持国家、国防、国际等课题30余项; 发表学术论文110余篇, SCI论文60余篇, 授权发明专利美国4项、日本5项、中国16项。先后获得中国青年科技奖、国家科技进步二等奖、美国机械工程师协会最佳论文奖、英国机械工程师协会最佳论文奖、中国内燃机学会突出贡献奖、全国优秀博士学位论文、清华大学学术新人奖、清华大学青年教师教学优秀奖、国防科技进步一等奖、山东省科技进步二等奖、国防科技进步三等奖、国防技术发明三等奖、教育部霍英东基金、教育部新世纪优秀人才支持计划、茅以升北京青年科技奖、中国内燃机学会史绍熙人才奖等16项奖励。

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教育背景

2016.07-2016.07, 中国延安干部学院, 中组部青年科技领军人才研修班

2000.09-2006.03, 北京航空航天大学, 能源与动力工程学院

1996.09-2000.06, 西北工业大学, 能源与动力工程学院

工作经历

2016.12-至今, 清华大学汽车工程系, 特别研究员(长聘)/博导

2013.09-2016.11, 清华大学汽车工程系, 副研究员/博导

2010.12-2013.08, 清华大学汽车工程系, 副研究员/硕导

2008.04-2010.11, 清华大学汽车工程系, 助理研究员/硕导

2006.04-2008.03, 清华大学汽车工程系, 博士后

2011.07-2012.07, 普林斯顿大学, 访问学者

所授课程

《发动机涡轮增压技术》

《计算流体力学》

研究领域

航空涡轮发动机(涡轴、涡桨、涡喷、涡扇)流动与叶轮机械技术

内燃机(汽油、柴油、氢能)流动与涡轮增压技术

车用/航空发动机混合动力技术

燃料电池涡轮增压技术

车用微型燃气轮机增程器技术



研究概况

主持“两机”重大专项项目，此外还主持国家自然科学基金、科技部、教育部、总装、国防科工局、国际合作、中国航空发动机集团、中国航天科工集团、中国第一汽车集团等课题30余项。

奖励与荣誉

- (1) 中国内燃机学会突出贡献奖（2017年，全国2人）
- (2) 中国青年科技奖（2016年）
- (3) 清华大学“青年教师教学优秀奖”（2015年，共10人）
- (4) 清华大学“学术新人奖”（2015年，共10人）
- (5) 国防科技进步三等奖（2015年）
- (6) 内燃机学会史绍熙人才奖（2014年）
- (7) 美国机械工程师协会最佳论文奖（2013年）
- (8) 国家科技进步二等奖（2013年）
- (9) 国防科技进步一等奖（2013年）
- (10) 教育部“新世纪优秀人才”支持计划（2013年）
- (11) 茅以升北京青年科技奖（2013年）
- (12) 英国机械工程师协会最佳论文奖（2011年）
- (13) 山东省科技进步二等奖（2011年）
- (14) 国防技术发明三等奖（2011年）
- (15) 教育部霍英东基金（2010年）
- (16) 全国优秀博士学位论文（2008年）

学术成果

共发表（含录用）论文110余篇，其中SCI收录60篇，EI收录100余篇。在ASME Journal of Turbomachinery、AIAA Journal of Propulsion and Power、Progress in Aerospace Sciences、Experimental Thermal and Fluid Sciences、Applied Thermal Engineering、International Journal of Heat and Fluid Flow等国际权威期刊发表论文30余篇。授权发明专利美国4项、日本5项、中国16项。代表性论文列表如下（*为通讯作者）：

ASME Journal of Turbomachinery

- [1] ZHENG Xinqian*, SUN Zhenzhong, KAWAKUBO Tomoki, TAMAKI Hideaki, “Stability Improvement of a Turbocharger Centrifugal Compressor by Non-Axisymmetric Vaned Diffuser,” Journal of Turbomachinery-Transactions of the ASME, 2018, 140 (4): 041007-1~13. (SCI: ; EI:)
- [2] ZHENG Xinqian*, HUANG Qiangqiang, LIU Anxiong, “Loss Mechanisms and Flow Control for Improved Efficiency of a Centrifugal Compressor at High Inlet Prewirl,” Journal of Turbomachinery-Transactions of the ASME, 2016, 138: 101011-1~11. (SCI: BF1AF; EI: 20162402492753)
- [3] ZHENG Xinqian*, Liu Anxiong, “Phenomenon and Mechanism of Two-Regime-Surge in a Centrifugal Compressor,” Journal of Turbomachinery-Transactions of the ASME, 2015, 137 (8): 081007-1~7. (SCI: CL3FI; EI: 20152901032948)
- [4] ZHENG Xinqian*, ZHANG Yangjun, YANG Mingyang, BAMBA Takahiro, TAMAKI Hideaki, “Stability Improvement of High-Pressure-Ratio Turbocharger Centrifugal Compressor by Asymmetric Flow Control—Part II: Non-Axisymmetric Self Recirculation Casing Treatment,” Journal of Turbomachinery-Transactions of the ASME, 2013, 135 (2): 021007-1~8. (SCI: 094KB; EI: 20124515648947)
- [5] YANG Mingyang, ZHENG Xinqian*, ZHANG Yangjun, BAMBA Takahiro, TAMAKI Hideaki, HUENTELER Joern, LI Zhigang, “Stability Improvement of High-Pressure-Ratio Turbocharger Centrifugal Compressor by Asymmetric Flow Control—Part I: Non-Axisymmetric Flow in Centrifugal Compressor,” Journal of Turbomachinery-Transactions of the ASME, 2013, 135 (2): 021006-1~9. (SCI: 094KB; EI: 20124515648946)
- [6] TAMAKI Hideaki*, ZHENG Xinqian, ZHANG Yangjun, “Experimental Investigation of High Pressure Ratio Centrifugal Compressor with Axisymmetric and Nonaxisymmetric Recirculation Device,” Journal of Turbomachinery-Transactions of the ASME, 2013, 135 (3): 031023-1~12. (SCI: 239KD; EI: 20133316600816)
- [7] ZHENG Xinqian*, ZHANG Yangjun, XING Weidong, ZHANG Junyue, “Separation Control of Axial Compressor Cascade by Fluidic-Based Excitations,” Journal of Turbomachinery-Transactions of the ASME, 2011, 133 (4): 041016-1~7. (SCI: 755SH; EI:20111713934397)
- [8] ZHENG Xinqian*, ZHOU Sheng, LU Yajun, HOU Anping, LI Qiushi, “Flow Control of Annular Compressor Cascade by Synthetic Jets,” Journal of Turbomachinery-Transactions of the ASME, 2008, 130 (2):

021018-1~7. (SCI: 279UP; EI: 20083111418141)

[9] **ZHENG Xinqian***, ZHOU Xiaobo, ZHOU Sheng, "Investigation on a Type of Flow Control to Weaken Unsteady Separated Flows by Unsteady Excitation in Axial Flow Compressors," Journal of Turbomachinery-Transactions of the ASME, 2005, 127 (3): 489-496. (SCI: 953KC; EI: 2005359327819)

AIAA Journal of Propulsion and Power

[10] **ZHENG Xinqian***, YANG Heli, "End-Wall Boundary Layers and Blockages of Multistage Axial Compressors Under Different Conditions," AIAA Journal of Propulsion and Power, 2017, 33 (4): 908-916. (SCI: EY9UP; EI: 20172603859149)

[11] HUANG Qiangqiang, **ZHENG Xinqian***, "Potential of Variable Geometry Method on Compressor Range Extension for Turbocharged Engines," AIAA Journal of Propulsion and Power, 2017, 33 (5): 1197-1206. (SCI: FE6JA, EI:20173504098403)

[12] HE Xiao, **ZHENG Xinqian***, "The Mechanisms of Lean on the Performance of Transonic Centrifugal Compressor Impellers," AIAA Journal of Propulsion and Power, 2016, 32 (5): 1220-1229. (SCI: DW2MH; EI: 20163502763102)

[13] YANG Mingyang*, MARTINEZ-BOTAS Ricardo, ZHANG Yangjun, **ZHENG Xinqian**, "Effect of Self-Recirculation-Casing Treatment on High Pressure Ratio Centrifugal Compressor," AIAA Journal of Propulsion and Power, 2016, 32 (3): 602-610. (SCI: DM9GH; EI: 20162102420993)

[14] **ZHENG Xinqian***, LIU Anxiong, "Experimental Investigation of Surge and Stall in a High-Speed Centrifugal Compressor," AIAA Journal of Propulsion and Power, 2015, 31 (3): 815-825. (SCI: CQ8ES; EI: 20152000847455)

Progress in Aerospace Sciences

[15] **ZHENG Xinqian***, LI Zhihui, "Blade-end Treatment to Improve the Performance of Axial Compressors: An Overview," Progress in Aerospace Sciences, 2017, 88: 1-14. (SCI: EI8PY; EI: 20165003110729)

[16] LI Zhihui, **ZHENG Xinqian***, "Review of Design Optimization Methods for Turbomachinery Aerodynamics," Progress in Aerospace Sciences, 2017, 93: 1-23. (SCI: FI8QC ; EI: 20172903947521)

Energy

[17] ZHU Dengting, **ZHENG Xinqian***, "Asymmetric Twin-Scroll Turbocharging in Diesel Engines for Energy and Emission Improvement," Energy, 2017, 141: 702-714. (SCI: FX8IM; EI: 20174104243415)

Experimental Thermal and Fluid Science

[18] **ZHENG Xinqian***, SUN Zhenzhong, KAWAKUBO Tomoki, TAMAKI Hideaki, "Experimental Investigation of Surge and Stall in a Turbocharger Centrifugal Compressor with a Vaned Diffuser," Experimental Thermal and Fluid Science, 2017, 82: 493-506. (SCI: EI8PI; EI: 20165203194855)

[19] LIU Anxiong, **ZHENG Xinqian***, "Methods of Surge Point Judgment for Compressor Experiments," Experimental Thermal and Fluid Science, 2013, 51: 204-213. (SCI: 249HH; EI: 20134016808435)

Applied Thermal Engineering

[20] SUN Zhenzhong, **ZHENG Xinqian***, KAWAKUBO Tomoki, "Experimental Investigation of Instability Inducement and Mechanism of Centrifugal Compressors with Vaned Diffuser," Applied Thermal Engineering, 2018, 133: 464-471. (SCI: ; EI:20180604768787)

[21] ZHANG Meijie, **ZHENG Xinqian***, "Criteria for the Matching of Inlet and Outlet Distortions in Centrifugal Compressors," Applied Thermal Engineering, 2018, 131: 933-946. (SCI:FU9JZ ; EI: 20175304592092)

[22] MOSTAFA Moosania, **ZHENG Xinqian***, "Effect of Internal Heat leakage on the Performance of a High Pressure Ratio Centrifugal Compressor," Applied Thermal Engineering, 2017, 111: 317-324. (SCI:EH6PU;EI:20163902856012)

IMechE Part A: Journal of Power and Energy

[23] **ZHENG Xinqian***, JIN Lei, TAMAKI Hideaki, "Influence of Volute-Induced Distortion on the Performance of a High-pressure-ratio Centrifugal Compressor with a Vaneless Diffuser for Turbocharger Applications," IMechE Part A: Journal of Power and Energy, 2014, 228 (4): 440-450. (SCI:AG8GH; EI: 20141917699337)

[24] YANG Dong, **ZHENG Xinqian**, LI Qiushi*, "An 11-Stage Axial Compressor Performance Simulation Considering the Change of Tip Clearance in Different Operating Conditions," IMechE Part A: Journal of Power and Energy, 2014, 228 (6): 614-625. (SCI: AM8YT; EI: 20143118009029)

[25] **ZHENG Xinqian***, HUENTELE Joern, YANG Mingyang, ZHANG Yangjun, BAMBA Takahiro, "Influence of the Volute on the Flow in a Centrifugal Compressor of a High-pressure Ratio Turbocharger," IMechE Part A: Journal of Power and Energy, 2010, 224 (A8): 1157-1169. (SCI:689PP; EI: 20112013991521; SAGE Best Paper Award)

IMechE Part D: Journal of Automobile Engineering

[26] WANG Aolin, **ZHENG Xinqian***, "Design Criterion for Asymmetric Twin-Entry Radial Turbine for Efficiency under Steady and Pulsating Inlet Conditions," IMechE Part D: Journal of Automobile Engineering, 2018, Online, DOI: 10.1177/0954407018757926. (SCI: ; EI:)

[27] SUN Zhenzhong, **ZHENG Xinqian***, LINGHU Zelin, KAWAKUBO Tomoki, TAMAKI Hideaki, WANG Baotong, "Influence of Volute Design on Flow Field Distortion and Flow Stability of Turbocharger Centrifugal Compressors," IMechE Part D: Journal of Automobile Engineering, 2018, Online, DOI:

10.1177/0954407017746281. (SCI ; EI)

[28] **ZHENG Xinqian***, LIU Anxiong, SUN Zhenzhong, "Investigation of the Instability Mechanisms in a Turbocharger Centrifugal Compressor with a Vaneless Diffuser by Means of Unsteady Simulations," *IMechE Part D: Journal of Automobile Engineering*, 2017, 231 (11): 1558-1567. (SCI: FF1CX; EI: 20173604117864)

[29] HUANG Qiangqiang, **ZHENG Xinqian***, "Potential of Variable Diffuser Vanes For Extending the Operating Range of Compressors and for Improving the Torque Performance of Turbocharged Engines," *IMechE Part D: Journal of Automobile Engineering*, 2017, 231 (4): 555-566. (SCI: EP2KK; EI: 20171003422011)

[30] MIRZAEI Saeed, **ZHENG Xinqian***, LIN Yun, "Improvement in the Stability of a Turbocharger Centrifugal Compressor by Tip Leakage Control," *IMechE Part D: Journal of Automobile Engineering*, 2017, 231 (5): 700-714. (SCI: ES7CQ; EI: 20171903643577)

[31] **ZHENG Xinqian***, HUANG Qiangqiang, "Potential of the Range Extension of Compressors with a Variable inlet Prewhirl for Automotive Turbocharged Engines with an Ultra-High-Power Density," *IMechE Part D: Journal of Automobile Engineering*, 2015, 229 (14): 1959-1968. (SCI: CW7IX; EI: 20154801604013)

[32] **ZHENG Xinqian***, LAN Chuanjie, "Improvement in the Performance of a High-Pressure-Ratio Turbocharger Centrifugal Compressor by Blade Bowing and Self-recirculation Casing Treatment," *IMechE Part D: Journal of Automobile Engineering*, 2014, 228 (1): 73-84. (SCI:293HK; EI: 20140517259632)

[33] ZHUGE Weilin, ZHANG Yangjun*, **ZHENG Xinqian***, YANG Mingyang, HE Yongshen, "Development of an Advanced Turbocharger Simulation Method for Cycle Simulation of Turbocharged Internal Combustion Engines," *IMechE Part D: Journal of Automobile Engineering*, 2009, 223 (5): 661-672. (SCI: 449VQ; EI: 20092212102920)

IMechE Part G: Journal of Aerospace Engineering

[34] YANG Heli, **ZHENG Xinqian***, "Investigation of Endwall Treatment and Shock Control in a Five-Stage Axial Compressor," *IMechE Part G: Journal of Aerospace Engineering*, 2018, Online, DOI: 10.1177/0954410017734884. (SCI ; EI)

[35] **ZHENG Xinqian***, LIN Yun, SUN Zhenzhong, "Effects of Volute's Asymmetry on the Performance of a Turbocharger Centrifugal Compressor," *IMechE Part G: Journal of Aerospace Engineering*, 2018, Online, DOI: 10.1177/0954410016670418. (SCI; EI)

[36] HE Xiao, **ZHENG Xinqian***, "Performance Improvement of Transonic Centrifugal Compressors by Optimization of Complex Three-Dimensional Features," *IMechE Part G: Journal of Aerospace Engineering*, 2017, 231 (14): 2723-2738. (SCI: FM7MQ; EI: 20174704434331)

[37] **ZHENG Xinqian***, DING Chuang, ZHANG Yangjun, "Influence of Different Loads on the Stresses of Multistage Axial Compressor Rotors," *IMechE Part G: Journal of Aerospace Engineering*, 2017, 231 (5): 787-798. (SCI: ES4HI; EI: 20171903643373)

[38] MOSTAFA Moosania, **ZHENG Xinqian***, "Performance Improvement of a High Pressure Ratio Centrifugal Compressor by Integrated Cooling," *IMechE Part G: Journal of Aerospace Engineering*, 2016, 230 (12): 2233-2240. (SCI: DV5LV; EI: 20163702804198)

[39] LI Zhihui, **ZHENG Xinqian***, LIU Yangming*, LI Qiushi, JI Baohua, "The Effect of End Wall Boundary Layer on Matching and Corresponding Flow Control Technique for Multistage Axial Compressor," *IMechE Part G: Journal of Aerospace Engineering*, 2016, 230 (12): 2179-2194. (SCI: DV5LV; EI: 20163702804194)

[40] LU Hanan, **ZHENG Xinqian***, LI Qiushi*, "A Combinatorial Optimization Design Method Applied to S-Shaped Compressor Transition Duct Design," *IMechE Part G: Journal of Aerospace Engineering*, 2014, 228 (10): 1749-1758. (SCI: AM8NB; EI: 20142917956491)

Sci China

[41] LINGHU Zelin, ZHAO Chenjia, YANG Heng, **ZHENG Xinqian***, "Beetle Wing Folding Facilitated by Micro-Protrusions on the Body Surface: a Case of *Allomyrina Dichotoma*," *Science Bulletin*, 2015, 60 (16): 1457-1460. (SCI: CQ4CC; EI:)

[42] **ZHENG Xinqian***, LAN ChuanJie, "Effects of Blade Bowing on the Performance of a High Pressure-Ratio Turbocharger Centrifugal Compressor with Self-recirculation Casing Treatment," *Sci China Ser E-Tech Sci*, 2013, 56 (10): 2531-2539. (SCI: 227PL; EI: 20134216867928)

[43] **ZHENG Xinqian***, LIN Yun, GAN Binlin, ZHUGE Weilin, ZHANG Yangjun, "Effects of Reynolds Number on the Performance of a High Pressure-Ratio Turbocharger Compressor," *Sci China Ser E-Tech Sci*, 2013, 56 (6): 1361-1369. (SCI: 168WR; EI: 20132816483688)

[44] **ZHENG Xinqian***, JIN Lei, TAMAKI Hideaki, "Influence of Volute Distortion on the Performance of Turbocharger Centrifugal Compressor with Vane Diffuser", *Sci China Ser E-Tech Sci*, 2013, 56 (11): 2778-2786. (SCI: 245JL; EI: 20134817033077)

[45] LIN Yun, **ZHENG Xinqian***, JIN Lei, TAMAKI Hideaki, KAWAKUBO Tomoki, "A Novel Experimental Method to Evaluate the Impact of the Volute'S Asymmetry on the Performance of a High Pressure Ratio Turbocharger Compressor," *Sci China Ser E-Tech Sci*, 2012, 55 (6): 1695-1700. (SCI: 943KV; EI: 20122615154776)

[46] **ZHENG Xinqian***, ZHANG Yangjun, YANG Mingyang, "Research and Development on Transonic Compressor of High Pressure Ratio Turbocharger for Vehicle Internal Combustion Engines," *Sci China Ser E-Tech Sci*, 2010, 53 (7): 1817-1823. (SCI: 621SZ; EI: 20103313151379)

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