

JIawei LIANG

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🎓 EDUCATION

ShanghaiTech University Ph.D. Electrical Engineering Sept. 2020 - present

Advisor: **Prof. Haoyu Wang**

Core courses: Advanced Power Conversion Techniques (A), Modeling and Control of Power Electronic Converters (A-), Analog Integrated Circuits II (A+)

Specialized courses GPA: 3.78/4

Research interests: Switched-capacitor converter, point-of-load converter and magnetic integration in data center applications

ShanghaiTech University B.E. Electronic Information Engineering Sept. 2016 - Jul. 2020

Core courses: Power Electronics (A), Digital Integrated Circuits (A), Analog Integrated Circuits (A-)

Overall GPA: 3.51/4 (Recommended exemption Graduate)

🔬 RESEARCH EXPERIENCES

Highly Integrated VRM for data center applications Nov. 2021 - present

- Propose novel topologies which combine switched-capacitor and LLC/SRC converters to reduced the turns ratio and switch rating.
- Operating the converter at its resonant frequency as a dc transformer (DCX) to achieve optimal efficiency.
- Proper control methods to achieve voltage regulation.
- Improve the power density by less-magnetics or integrated-magnetics.

Light load efficiency boost technique for STC May 2021 - Jan. 2022

- Propose a hybrid soft switching control scheme to improve the light-load efficiency of switched-tank converter (STC);
- Regulate the frequency and phase shift such that the converter is tuned in either zero-current-switching (ZCS) or zero-voltage-switching (ZVS) mode;
- Built the switching loss model to optimize the soft switching control scheme.

Merged H-bridge based STC for front-end VRMs Sept. 2020 - May 2021

- Propose a merged H-bridge based STC to serve as the front end non-regulated stage of VRM;
- Analyze and design a 6-to-1 STC with ZCS operation;
- A hardware prototype that converts 48 V to 8 V is designed and tested. The maximum output current can reach 28 A, and the peak efficiency is 97.11%.

👜 INTERNSHIP

Bosch (China) Investment Ltd. (CR/RMD-AP) Jul. 2024 - Dec. 2024

- Research on 4.4 kW high power density PFC based on GaN.
- Power circuit design, magnetic design and component selection.

🏆 SELECTED HONORS & AWARDS

2024 National Scholarship

2022-2023 Outstanding Student of ShanghaiTech University

2023	Excellent Paper Award & Best Presenter in PEAS 2023
2023	Excellent Popular Sci. Popularization Award, 6th Innov. & Entr. Conf., ShanghaiTech Univ.
2023	The second prize in the Third SUNGROW College Innovation Competition;
2022	Excellent Popular Sci. Popularization Award, 5th Innov. & Entr. Conf., ShanghaiTech Univ.
2021-2022	Merit Student of ShanghaiTech University
2020-2021	Merit Student of ShanghaiTech University
2021	Excellent Popular Science Video Award, 4th Innov. & Entr. Conf., ShanghaiTech Univ.

PUBLICATIONS

1. Journal

- [J1] **J. Liang**, Y. Qin, Y. Liu, M. Fu, and H. Wang*, “Phase Shift Regulated Resonant Switched Capacitor Based Intermediate Bus Converter for 48V Data Center Power System,” *IEEE Trans. Ind. Electron.*, in press. (accepted on May 30, 2024)
- [J2] **J. Liang**, L. Wang, J. Liang, M. Fu, T. Long and H. Wang*, “A Switched-Capacitor and Series-Resonant Hybrid MHz DCX in Data Center Applications,” *IEEE Trans. Power Electron.*, vol. 39, no. 10, pp. 13389-13400, Oct. 2024.
- [J3] **J. Liang**, L. Wang, M. Fu, J. Liang, and H. Wang*, “Overview of Voltage Regulator Modules in 48V Bus-based Data Center Power Systems,” *CPSS Trans. Power Electron. Appl.*, vol. 7, no. 3, Sept. 2022.

2. Conference

- [C1] **J. Liang** and H. Wang, “A Resonant Switched-Capacitor LLC DCX in Data Center Applications,” in *Proc. Int. Power Electron. Appl. Symp. (PEAS)*, Guangzhou, China, Nov. 2023, pp. 676-680. (**Excellent Paper Award**)
- [C2] **J. Liang**, and H. Wang*, “Light Load Efficiency Boost Technique for Switched Tank Converters Based on Hybrid ZVS-ZCS Control,” in *Proc. Int. Power Electron. Conf. (IPEC-ECCE Asia)*, Himeji, Japan, May 2022, pp. 2231-2235.
- [C3] **J. Liang**, H. Wang*, and H. Yang, “A merged H-bridge based switched tank converter for front-end voltage regulator modules,” in *Proc. IEEE Energy Convers. Congr. Expo. (ECCE)*, Vancouver, BC, Oct. 2021, pp. 1995-2000.
- [C4] Z. Liu, **J. Liang**, and H. Wang*, “Optimal Design of Hexagonal Matrix Transformer for 48V-1V Switched-Capacitor and Series-Resonant Converter,” in *Proc. Int. Power Electron. Motion Control Conf. (IPEMC-ECCE Asia)*, Chengdu, China, May 2024.
- [C5] L. Wang, C. Li, **J. Liang**, and H. Wang*, “A multi-phase series capacitor trans-inductor voltage regulator with high switching frequency and fast dynamic response,” in *Proc. IEEE Appl. Power Electron. Conf. Expo. (APEC)*, Orlando, FL, Mar. 2023, pp. 2207-2212.

3. Patent

- [P1] **J. Liang** and H. Wang, “A Phase Shift Regulated Resonant Converter with Wide Input Voltage Range,” in *China Patent*, Application No. CN202410427243 .7, submitted on Apr. 10th, 2024.
- [P2] **J. Liang** and H. Wang, “Hybrid high step-down switched-capacitor and series-resonant converter,” in *China Patent*, Application No. CN202311042761 .9, submitted on Aug. 17th, 2023.

ORAL PRESENTATIONS

- “A Resonant Switched-Capacitor LLC DCX in Data Center Applications,” *Int. Power Electron. Appl. Symp. (PEAS)*, Guangzhou, China, Nov. 2023. (**won the Best Presenter**)
- “48V bus-based datacentre voltage regulator modules: topology, control and magnetic integration,” *IEEE Int. Power Electron. Appl. Conf. Expo. (PEAC 2022)*, Xiamen, China, Nov. 2022. (3.5hrs tutorial)
- “Light Load Efficiency Boost Technique for Switched Tank Converters Based on Hybrid ZVS-ZCS Control,” *Int. Power Electron. Conf. (IPEC-ECCE Asia)*, Himeji, Japan, May 2022.
- “A merged H-bridge based switched tank converter for front-end voltage regulator modules,” *IEEE Energy Convers. Congr. Expo. (ECCE)*, Vancouver, BC, Canada, Oct. 2021.

TEACHING AND VOLUNTEER EXPERIENCES

1. Teaching Assistant

EE270 Modeling and Control of Power Electronic Converters Sept. 2021- Jan. 2022

- Prepare, grade, and guide homework/project;
- Lead and teach project experiments;
- Update and maintain course website.

EE111 Electric Circuits Mar. 2020- Jul. 2020

- Lead and teach discussion class;
- Communicate with students to solve their problems, and help them to improve;
- Update and maintain course website.

2. Volunteer

Open Campus Day, ShanghaiTech University Jun. 2020,2021

PROFESSIONAL SKILLS

Language	CET-6, good technical writing and reading skills, fluent in speaking.
Software	Ansys Maxwell, Altium Designer, PSIM, Matlab/Simulink, LTspice, Visio, Python
Hardware	TMS320F28335, TMS320F28379, STM32F10x
Equipment	Oscilloscope, Electronic Source/Load, Impedance Analyzer, Power Devices Analyzer, Power Analyzer

PROFESSIONAL SERVICES

Membership	Student member & Young Professionals, IEEE	Mar. 2024 - present
	Student member, CPSS	Sept. 2021 - present
Reviewer	IEEE Transaction on Industrial Electronics	Feb. 2022 - present
	IEEE Transaction on Power Electronics	Oct. 2022 - present
	IEEE Transactions on Transportation Electrification	Jun. 2021 - present
	IEEE Appl. Power Electron. Conf. Expo. (APEC)	2021, 2022, 2023