

# 北达科达州立大学(NDSU)Dong Cao 博士讲座



讲座题目：

High Density High Conversion Ratio Resonant Switched-Capacitor Converters (Switched-Tank Converters) for Data-center Application

讲座时间：2018年5月29日下午2:30

讲座地点：电机工程楼201室

讲座摘要：

In order to meet the high efficiency, high power density, high conversion ratio and low cost needs for future 48 V data-center dc power delivery architecture, many new transformer based topologies using wide bandgap devices i.e. GaN operating at high frequency have been proposed. Although the GaN have relatively power loss due to the material performance and soft-switching, the transformer core loss and copper loss will increase with the switching frequency and it has become the bottleneck limiting the efficiency and power density improvement. More importantly, the transformer based topology also have manufacturability and scalability issues which requires optimization and long engineering design and verification time, it is hard to meet the fast pace of the new CPU release with new power requirement. Therefore, a more modular, scalable, and transformer-less high conversion ratio solution is required for the future 48V data-center dc power delivery.

This talk will provide a new high conversion ratio transformer-less resonant switched-capacitor dc-dc converter solution for the future 48V data-center power delivery. It has the modular, scalable, high efficiency, and high power density features. This talk will begin with the review of development of the history of such high conversion ratio resonant switched-capacitor converters, and traditional switched-capacitor converter design issues. It will also cover the recent development of such converters for the the google's data-center 48V bus application, it will also discuss some solutions addressing the mass production issues. The project is also partly sponsored by Google.

报告人简介：

**Dr. Dong Cao** received the B.S. degree from Zhejiang University in 2005 and the M.S. and Ph.D. degrees in electrical engineering from Michigan State University, in 2010 and 2012, respectively. He worked at Ford Motor Company as a power electronics core engineer for hybrid electric vehicle electrified driveline hardware development from 2012 ~ 2014. He joined North Dakota State University as an assistant professor since Aug. 2014.

His research interests includes resonant and soft-switching techniques, switched-capacitor dc-dc converter, multilevel converters, wide bandgap devices (GaN/SiC) applications, High density converter for EV applications, power conversion for distributed energy sources, health monitoring and life time prediction of power converters, and intelligent gate drive for high power devices and Z-source inverter/converters.

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