GRAPES

GRid-connected Advanced Power Electronic Systems

GRAPES MISSION

The center aims to accelerate the integration of power electronics into the electric grid to enhance stability, flexibility, robustness, and economy.

Key objectives include:

- Developing advanced technologies for grid-connected distributed energy resources, power steering and routing devices, and intelligent load-side devices
- Creating software and tools for controlling embedded and grid-connected power electronics to optimize grid performance and manage loads
- Educating engineers on essential power electronic technologies relevant to member companies

RESEARCH

Research will concentrate on design, development, evaluation, control, and standardization of grid-connected power electronic equipment on both the supply and load side of power systems.

Relevant research areas include:

- Power systems, especially off-grid systems such as in transportation systems (ships, planes, trains, automobiles)
- Power electronics devices, characterization, modeling
- Simulation methods and environments for multidisciplinary dynamic systems

SAMPLE PROJECTS

- Design and Demonstration of 6.5kV SiC Based Medium Voltage Shunt Active Power Filter (MV-SAPF)
- High Performance Half-Bridge Module Structure for 1.2-kV Ga203 MOSFET
- D120kVA Three-Phase Grid-Tied Inverter with Active Controlled Parallel SiC MOSFETS
- Development of GaN Based Compact Scalable Multilevel Inverter Building Block

GRADUATED PROJECT

- Active Gate Driving for Paralleled High Voltage SiC MOSFET Power Modules
- Distributed Energy Resource Management System for Residential Systems
- Novel Back-to-Back Converter Configuration for Hybrid AC Transmission with Multi-Terminal DC Operation

UNIVERSITY OF ARKANSAS

UNIVERSITY OF ARKANSAS | College of Engineering
National Center for Reliable Electric Power Transmission

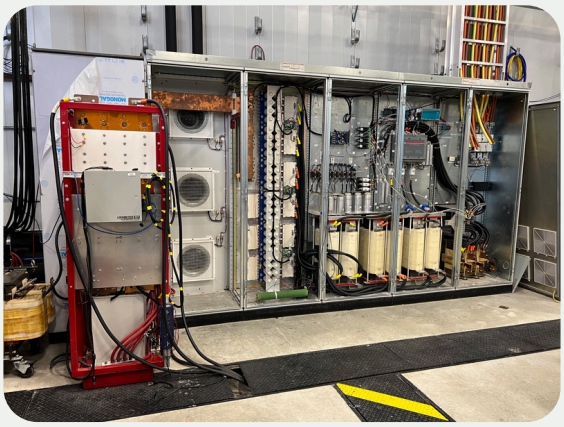
NCREPT.UARK.EDU

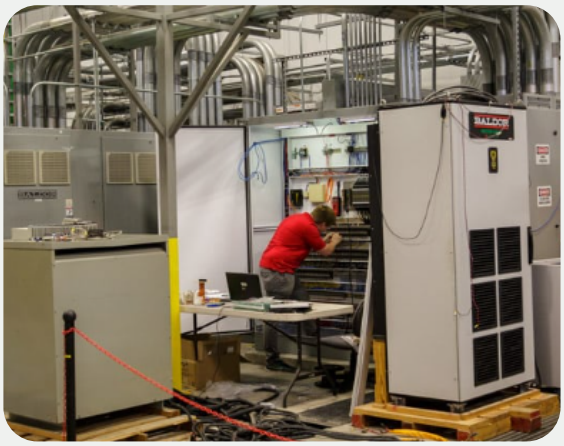
NATIONAL CENTER FOR RELIABLE ELECTRIC POWER TRANSMISSION (NCREPT)

Established for the purpose of investigating solid-state solutions for the electric power grid including protection devices and FACTS as well as energy storage and distributed generation applications.

Features include:

- One of the Highest Power Test Facility on a U.S. University Campus
- Internationally Recognized, Award Winning Research (4 R&D Awards)
- Supports 3 Centers of Excellence
- 70 feet of Wall-Mounted 480 V/1200 A ac Busway
- 70 feet of Wall-Mounted 1500 V/1500 A dc Busway
- Server/IT Room Dedicated for Cyber Security Research Equipment
- 120 Ton Chiller
- 400 Sq. Ft. SCIF/Secure Room





STATE IMPACTS OF THIS TECHNO-ECOSYSTEM

- R&D funding over $100 million in last 10 years
- Spin-out companies (5)
- Founding, nurturing & advising of businesses
- Unique technical service provider to companies that lower costs
- Provider of specialized talent to industry
- Cooperative R&D with industry (over 50 companies)
- Patents & copyrights

PARTNER UNIVERSITIES

UNIVERSITY OF South Carolina

UNIVERSITY of WISCONSIN UWMILWAUKEE

An NSF Industry/University Cooperative Research Center