

*Department of Electrical and Computer Engineering  
Colloquium*

**High Voltage based Power Electronics**

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**Dreese Laboratory 260**

**Abstract:** High voltage engineering is based on theories like air breakdown, insulation material characteristics, and power system over voltage. The basic practices of high voltage engineering include high voltage equipment manufacturing, high voltage/high current testing, online equipment insulation monitoring and etc. Power electronics is built based on solid device technology, PWM methods, control theories, material selection, thermal management, and electronics based control. In power system and different industries, there are many high voltage and power electronics combined applications. In power system, the best examples are FACTs and HVDC. In other industries, power electronics based high voltage pulse generations are widely used for different purpose such as food process and material treatment. The medium voltage drive and high voltage power supplies also can be seen as the low voltage end applications of the high voltage based power electronics. Besides these field applications, controlled power electronics devices are now adopted to lower the cost, size, and at the same time to improve the performance of traditional high voltage test equipments.

The presentation is divided into three parts. At the beginning, the basics of high voltage and power electronics and their combined applications are introduced in general. Then a cascade multilevel inverter based UPFC will be introduced to show the application of high voltage based power electronics in FACTs devices. The last part of the presentation would briefly show different research topics.

**Biography:** Dr. Jin Wang received his bachelor's degree in High Voltage Engineering from Xi'an Jiaotong University in 1998. He got his master's degree in Power System from Wuhan University in 2001. In 2005, he received his Ph. D. Degree in Power Electronics from Michigan State University. Now Dr. Wang is working at Ford, developing high power traction inverters and other power electronics components for hybrid vehicles. Dr. Wang's research areas include FACTs devices, distributed generations, medium voltage drives, hybrid vehicles, and high voltage/high power switching power supplies. Since Dr. Wang joined Ford at the end of 2005, he has submitted more than 10 invention disclosures, which have already resulted in one defensive publication and 2 pending patents.