Abstract: Demonstration of a Medium Voltage Power Module for High Density Conversion

The SuperCascode Power Module (SCPM) is a new approach to medium voltage switching that uses a series string of SiC JFETs in a cascode configuration switched with a Si MOSFET. This project, in concert with USCi, develops a 6.5kV, 100A and 200A power module specifically in a 57 Pack for direct comparison to Si-IGBT modules of same power rating. Also developed is a continuous Full-Power emulation Test Platform (FPTP) based on a recirculating energy concept, and will demonstrate full-power in-situ performance of the SCPM. The FPTP is a stand-alone platform available for high power testing of future modules.

The presentation will describe origins of the supercascode circuit and introduce a new balancing circuit that is more compatible with the packaging approach. Electrical simulations will show static and dynamic performance, and projected power dissipation of the switching module. A full thermal analysis is provided along with details and selected design rules of the '57 Pack' fabrication.