Researchers at the University of South Florida have developed a novel ion application system and method to prevent the spread of excess charge during treatment while still maintaining the necessary charge density at the treatment site.

Multiple processes, including electroporation, electromigration, disinfection and hair removal, involve the use of an electric field or integrated ion flux. While many current technologies use ion application methods, these technologies make little effort to control the spread of excess charge on the rest of the patient’s body. The magnitude of the electric field outside of the intended treatment region may be hazardous to the patient, nearby personnel and electric equipment. Therefore, there is a need for an improved system which prevents charge dissipation while still maintaining the desired charge in the intended treatment region.

USF researchers have developed a system which includes a physical perimeter conductor positioned near a tissue surface, and a conductance control circuit to collect applied surface charge. This control circuit helps to maintain a desired relationship between surface charge density and time. Effective containment of the charge establishes a controlled charge density and provides an increased efficiency of involved processes, defines the region of treatment, and facilitates temporal modulation of the electric field at the treatment site. Therefore, this invention also protects the subject, nearby personnel and equipment from potentially harmful electrostatic discharge.

ADVANTAGES:
- Maintains a charge density only at the tissue treatment site
- Utilizes significantly less charge
- Protects the subject and additional personnel from electrostatic discharges
- Increased efficiency

A Novel Method for Perimeter Ion Control and Extraction of Electrostatic Discharge

Plan View (Top) and Cross Section View (Bottom) of the System Operating on a Tissue Surface