



Contribution ID: 91

Type: **Poster Presentation**

Optical diagnostics of single-wire electrical explosion in vacuum

Friday, 8 July 2016 14:40 (20 minutes)

PPG-3 is a small-scale pulsed power device built to study the physical process of single wire electrical explosion (EEW). It is composed of a capacitor bank of 10nF charged to 0-60kV, a laser-triggered switch, a 50 ohm transmission line and a discharge chamber housing the exploding wire. The voltage and current waveforms of the exploding wire were measured with a capacitive divider and a current shunt, respectively. A Mach-Zehnder laser interferometer as well as a high-speed camera with 4ns exposure time is applied to capture the pictures of the exploding wire. Tungsten wires with 10-25 μ m diameter have been tested and ~13 μ m diameter turns out to be a maximum for energy deposition. In order to get a direct knowledge of the surface breakdown process during EEW, an optical fiber array probe is applied to collect the self-radiation from different part of the wire; the optical signal is then converted to voltage waveform by photoelectric detectors with response time less than 1ns. This helps identify the initiation location and the progressing direction and speed of surface breakdown.

Primary author: SHI, Huantong (Tsinghua University)

Co-authors: Prof. ZOU, Xiaobing (Department of Electrical Engineering, Tsinghua University); Prof. WANG, Xinxin (Department of Electrical Engineering, Tsinghua University)

Presenter: SHI, Huantong (Tsinghua University)

Session Classification: Poster 3-A

Track Classification: Plasmas, Discharges, and Electromagnetic Phenomena