Contribution ID: **393** Type: **Oral**

Comparative study of laser triggered pressurized spark gaps

Wednesday 21 June 2017 16:15 (15 minutes)

The UV laser triggering of high pulse power switches has been quite extensively studied over the past decades. This tool gives generally access to a reliable triggering with low jitter. New generations of lasers allow now to work with other wavelengths available at higher energy. How these two parameters interplay in the triggering mechanism? How could they be optimized to increase the triggering efficiency?

In this context, we have developed an experimental setup in order to make a triggering comparative study with a pressurized spark gap on which a static potential was applied. We have used a Nd;YAG laser allowing to work with three different wavelengths and energy range: 1064nm (<850mJ), 532nm (<430mJ) and 266nm (<150mJ). Our capacity to initiate the breakdown at low voltage (relative to its self-break voltage) was investigated depending on the wavelength, the energy and the focal distance of the laser, as well as the pressure (≤3bar) and the gap [5; 6.5; 8cm] of the switch.

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Session Classification: Oral session 17 - High Voltage Switching technology - Session Chair : Richard Ness

Track Classification: High Power Microwaves, RF Sources and Antennas