Contribution ID: **611** Type: **Oral**

First implementation of a solid-state Impedance-Matched Marx Generator

Wednesday 26 June 2019 10:00 (30 minutes)

In this contribution we present the first implementation of a solid-state impedance-matched Marx generator (IMG). Our application - transient plasma for environmental applications - requires fast (several ns rise time), high-voltage pulses with flexible pulse duration (10-100's of nanoseconds) and amplitude (up to several tens of kV). The IMG topology was introduced in 2017 by researchers from Sandia National Laboratories and is ideally suited to generate such pulses. Where the original IMG topology was conceived with modules ("bricks") of spark gaps and capacitors (just like in linear transformer drivers), we implemented the IMG topology with MOSFET switches, capacitors and PCB transmission lines into a first prototype of ten 1-kV stages. This first prototype is capable of generating fast pulses with 10-kV output voltage, adjustable pulse duration and <5 ns rise time. The impedance-matched structure consists of coaxial 1-kV stages comprising multiple parallel transmission lines, each energized by a fast MOSFET circuit. These stages are stacked in series and a coaxial transmission line placed at the center of the IMG structure ensures proper impedance matching. The solid-state IMG was designed with 3D transient EM simulations, circuit simulations and experimental verification of single stages and the full-stage prototype. In this contribution, we present the first results.

Authors: Dr HUISKAMP, Tom (Eindhoven University of Technology); Mr VAN OORSCHOT, Jeroen (Eindhoven University of Technology)

Presenter: Dr HUISKAMP, Tom (Eindhoven University of Technology)

Session Classification: 7.3 Compact Pulsed Power

Track Classification: 7.3 Compact Pulsed Power