SOLENT UNIVERSITY

Dual Resonant Solid State Tesla Coil

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Background & Aim

- Prysmian Group (employer) own largest high voltage research laboratory in the UK.
- The aim of the project was to design and construct a high voltage exhibit to display in the laboratory.
- A dual resonant solid state Tesla coil was selected as it combines high voltage engineering and power electronics.

Methodology

- Researched existing technologies to identify critical design elements and construction techniques.
- Modelled system design using simulation software
- Constructed prototype in high voltage laboratory
- Tested prototype against design specification.

Design

- 2.5 meter tall prototype
- Two air cored inductively coupled resonant circuits
- 4 x 1200V, 600A IGBTs in H-bridge configuration
- 1100A peak primary resonant current
- Fibre optic isolated control system
- Input: 230VAC, 50Hz, 32A
- Output: > 500kVAC, 35kHz

Results & Recommendations

- Testing verified prototype is capable of producing electric sparks in excess of 2 meters.
- Further testing required to modulate output sparks to produce musical tones from MIDI files.
- Future work will focus on implementing musical output and optimising the system to maximise output spark length.