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DESIGN AND CONSTRUCTION OF HIGH VOLTAGE MODULATORS TO PRODUCE RECTANGULAR PULSES

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During the past four years, the SIAME laboratory (University of Pau) and the EFFITECH company have combined their skills to design and construct two high different modulators. The name of this project funded by the French Ministry for Defense is “AGIR” which is the French acronym for “Architecture for rectangular pulse generation”.

The first structure (AGIR1) implements a series/parallel combination of resonant modules, optimized for operation in pulse mode and high repetition frequency (200kHz) to reach peak powers up to 10MW. The voltage can be adjusted from 1 to 100kV and the pulse width can be adjusted up to 100 μ s with a deviation of less than 5%. It is based on half H bridge with SiC components and a pulse transformer with Vitroperm Core.

The second one (AGIR2) is based on a multi-primary pulse transformer powered by four synchronized Blumlein generators. It allows reaching peak powers of several hundred MW. To achieve these specifications, spark gap switches are used and their triggered synchronisation is optimized to allow the complete transfer through the Metglass core transformer. The output performances are a maximum voltage of 300kV, a pulse duration of 600ns with a deviation of 7.5%.

This paper is a global presentation of these pulse modulators.

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