

20-MW LONG-PULSE-KLYSTRON MODULATOR

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Abstract

For the TESLA Test facility (TTF) at DESY Hamburg a long-pulse klystron modulator has been designed to drive the new 10MW-multibeam klystron TH18101. The main modulator parameters are: primary voltage amplitudes < 12 kV, current amplitudes < 1.7 kA, pulse length < 1.7 ms at a repetition rate < 10 Hz. The main goal of the development at PPT is to reach at a reliable and cost-effective design to allow for the production of about 750 TESLA modulators. This can best be achieved by reducing the construction requirements and focussing on components widely used in industrial applications. Based on the first design of FERMI Lab the main features of the new pulse modulator are:

- 1) a rugged, compact IGCT-switch stack, with seven 4.5-kV IGCTs from ABB, integrated gate units, small snubber circuits and a 4-kA current turn-off capability.
- 2) a volume optimized storage capacitor construction using high energy capacitors with self-healing segmented PP-foil technology.
- 3) a 300-kW-switched mode power supply with a new regulating system to avoid the generation of powerful subharmonic disturbances back into the line.

First results as well as cost and lifetime estimations are presented.