Doctoral Thesis

Ueber verbesserte Intrapuls-Frequenzstabilität von Magnetrons in Modulatoren mit Impulstransformatoren

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Über verbesserte Intrapuls-Frequenzstabilität von Magnetrons in Modulatoren mit Impulstransformatoren

[The Improvement of Intrapulse Frequency Stability of Magnetrons in Pulsers with Pulse Transformers]

ABHANDLUNG

zur Erlangung
der Würde eines Doktors der technischen Wissenschaften
der
EIDGENÖSSISCHEN TECHNISCHEN HOCHSCHULE
ZÜRICH

vorgelegt von

ARMIN HÜRLIMANN
dipl. El. Ing. ETH
geboren am 11. Juli 1930
von Zürich und Walchwil (Kt. Zug)

Angenommen auf Antrag von
Prof. Dr. G. Epprecht, Referent
Prof. H. Weber, Korreferent

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SUMMARY

The following investigation is concentrated on the improvement of magnetron frequency stability in pulsers with pulse transformers. In a first part the different parameters for magnetron instabilities are treated with a special experimental analysis on frequency pushing characteristics of tunable magnetrons. As a result of the experimental work a correlation between magnetron pulling and pushing depending on loading effects is discussed and compared with literature. In a second part methods of pulse droop compensation in hard tube pulsers and line type pulsers are mathematically and experimentally worked out with respect to the problem of minimizing anode current modulation for improving intrapulse frequency stability. Finally a method for improving overall efficiency of modulator systems by energy feedback and proposals for controlling the rate of rise of anode voltage for proper \( \pi \)-mode starting as a consequence of improved modulator design are shown.