

Author(s): Redondo, LM (Redondo, L. M.); Silva, JF (Silva, J. Fernando); Canacsinh, H (Canacsinh, H.); Ferrao, N (Ferrao, N.); Mendes, C (Mendes, C.); Soares, R (Soares, R.); Schipper, J (Schipper, J.); Fowler, A (Fowler, A.)

Title: Solid-state Marx based two-switch voltage modulator for the On-Line Isotope Mass Separator accelerator at the European Organization for Nuclear Research

Source: Review of Scientific Instruments, 81 (7): Art. No. 074703 JUL 2010

Language: English

Document Type: Article

KeyWords Plus: Ion-Implantation; Generator

Abstract: A new circuit topology is proposed to replace the actual pulse transformer and thyatron based resonant modulator that supplies the 60 kV target potential for the ion acceleration of the On-Line Isotope Mass Separator accelerator, the stability of which is critical for the mass resolution downstream separator, at the European Organization for Nuclear Research. The improved modulator uses two solid-state switches working together, each one based on the Marx generator concept, operating as series and parallel switches, reducing the stress on the series stacked semiconductors, and also as auxiliary pulse generator in order to fulfill the target requirements. Preliminary results of a 10 kV prototype, using 1200 V insulated gate bipolar transistors and capacitors in the solid-state Marx circuits, ten stages each, with an electrical equivalent circuit of the target, are presented, demonstrating both the improved voltage stability and pulse flexibility potential wanted for this new modulator. (C) 2010 American Institute of Physics. [doi :10.1063/1.3461134]

Addresses: [Redondo, L. M.; Canacsinh, H.; Ferrao, N.; Mendes, C.] ISEL, P-1959007 Lisbon, Portugal; [Redondo, L. M.; Canacsinh, H.; Ferrao, N.; Mendes, C.; Soares, R.] Lisbon Univ CFNUL, Nucl Phys Ctr, P-1649003 Lisbon, Portugal; [Silva, J. Fernando] Univ Tecn Lisbon, IST, P-1049001 Lisbon, Portugal; [Silva, J. Fernando] TU Lisbon, Ctr Innovat Elect & Energy Engr, P-1049001 Lisbon, Portugal

Reprint Address: Redondo, LM, Inst Super Engrn Lisboa DEEA JSEL, Rua Conselheiro Emidio Navarro 1, P-1959007 Lisbon, Portugal.

E-mail Address: lmredondo@deea.isel.ipl.pt

Publisher: AMER INST PHYSICS

Publisher Address: CIRCULATION & FULFILLMENT DIV, 2 HUNTINGTON QUADRANGLE, STE 1 N O 1, MELVILLE, NY 11747-4501 USA

ISSN: 0034-6748

Article Number: 074703

DOI: 10.1063/1.3461134

29-char Source Abbrev.: REV SCI INSTR

ISI Document Delivery No.: 640FE