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A high-repetition rate, magnetic core, pulse transformer based, fast 120 kV generator

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A high-repetition rate, magnetic core, pulse transformer based, fast 120 kV generator Jessica Stobbs, B.M. Novac and P. Senior Loughborough University, UK T. Huiskamp, F.J.C.M. Beckers and A.J.M. Pemen Eindhoven University of Technology, The Netherlands

We present a high repetition rate, high-voltage pulse generator based on a compact high-voltage pulse transformer. The magnetic-core transformer is capable to charge a HV 1-nF capacitor load to over 120 kV. It has a turns ratio of 1:12 and is energized by a primary capacitor bank of 150 nF charged to an initial voltage of about 13 kV and a corona stabilized switch. By employing bespoke nanocrystalline cores and a careful design, the leakage inductance of the transformer is minimised, which results in a very fast charging time of the HV capacitor to the nominal peak voltage in about 250 ns. Results from operating the transformer in single-shot mode and at a pulse repetition rate of 1 kHz will both be presented.

Authors: Ms STOBBS, Jessica (Loughborough University); Prof. NOVAC, Bucur (Loughborough); SENIOR, Peter (Loughborough University); HUISKAMP, Tom; Dr BECKERS, Frank (Eindhoven University of Technology); Prof. PEMEN, Guus (Eindhoven University of Technology)

Presenter: Ms STOBBS, Jessica (Loughborough University)

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