

Contribution ID: 154

Type: Oral

A HYBRID BOUNCER SYSTEM FOR HIGHLY REPEATABLE AND PRECISE KLYSTRON MODULATORS

Monday 19 June 2017 17:00 (15 minutes)

In the framework of the CLIC project at CERN, the team in charge of the study of the klystron modulators faces new challenges to achieve high precision and repeatable pulses. This challenge consists in generating precise and repeatable pulses of 140μ s at 50Hz. The pulsed power is 30MW at a voltage of 180kV.

This paper presents the study and the evaluation of a new hybrid bouncer circuit. It is intended to be used in a high voltage modulator based on a capacitor discharge topology, to increase the pulses quality (precision and repeatability). This hybrid bouncer circuit is based on the association of the well-known passive resonant L-C bouncer, and a closed-loop controlled active circuit using switches in linear mode. The latter aims at compensating the inherent inaccuracies and drifts of the passive elements at the cost of a slightly increased losses.

After evaluating this circuit through analytical calculations and numerical simulations, this paper focuses on the design procedure by providing methods to help the designer in the choice of the components (passive elements and switches). In addition, the design of the closed loop is discussed and the limiting factors in the gaining of a large bandwidth are identified and translated in requirements for the components. Then, the measurements performed on a reduced scale prototype are presented and analysed.

Authors: Dr AGUGLIA, Davide (CERN); Dr BONNIN, Xavier (CERN)

Presenter: Dr BONNIN, Xavier (CERN)

Session Classification: Oral session 5 - Pulse Forming Networks and Alternate Technologies (part I) - Session Chair : John Mankowski

Track Classification: High Power Electronics