



Contribution ID: 196

Type: Oral

Study on the Isolation of Multiple STRETCH Meat Grinder Modules

Wednesday 21 June 2017 16:45 (15 minutes)

The STRETCH meat grinder, put forward by IAT (Institute for Advanced Technology), is a typical inductive pulsed power supply (IPPS) unit for electromagnetic launch systems. When multiple STRETCH meat grinder modules supply one railgun load together, the currents flowing among these modules might cause them being coupled with each other. In order to promote the modularization of IPPS modules and diminish the current coupling effect, two STRETCH meat grinder modules are selected to analyze. We find that, by increasing the ratio of the first inductance value to the second inductance value and the ratio of the second inductance value to the load inductance value, the current coupling among these modules can be reduced. More than 98% of the module current will be supplied to the load when the ratio of the second inductance value to the load inductance value reaches 50. To verify the above theory, the prototype experiment and simulation are carried out with two modules feeding one load in the case that the two modules are triggered at different times. In order to compare the effect of the isolation, one criterion is defined as taking the root mean square (rms) of the current values of 10k points on the load current waveforms and the corresponding points on the standard load current waveforms with the discharge time range from 7.55 to 11ms. The smaller value means the better isolation. By analyzing the above criterion, the consistency of the theoretical results and the experimental results are approved. So by increasing the ratio of the first inductance value to the second inductance value and the ratio of the second inductance value to the load inductance value, the modules can reduce the coupling current among them. This result also provides certain theoretical guidance for the practical engineering applications.

Authors: Mr LI, Zhen (Tsinghua University); LIU, Hui (Tsinghua University); Dr YU, Xinjie (Tsinghua University)

Presenter: LIU, Hui (Tsinghua University)

Session Classification: Oral session 16 - Solid State Modulators and Pulsed Magnets for Accelerators, Electromagnetic Launchers - Session Chair : Michael John Barnes

Track Classification: Pulsed Power Industrial and Bio-Medical Applications