Using inductive energy storage

An inductive energy storage switch system for the destruction of solid materials is reported. This is based on creating a pulsed electric breakdown in the solid dielectric, which then propagates in the specimen. This scheme provides a higher destruction effectiveness compared to a capacitive energy storage system. The higher energy efficiency is attributed to ...

Both methods use inductive energy storage (IES) instead of traditional capacitive energy storage (CES), which means that the PFLs are charged by current instead of voltage. One of the methods (Type A) used an additional transmission-line-transformer (TLT) to achieve the output voltage adding from multiple PFLs, while the other method (Type B ...

For pulsed power generation, the energy storage unit is one of the most fundamental components. The common energy storage methods in the current pulse power systems are capacitive energy storage (CES) and inductive energy storage (IES), each with its own advantages and disadvantages. In this study, we have tested a circuit using both CES and ...

Linear Inductive Energy Storage 1: Linear inductive energy storage involves the use of linear inductors. It has a simple design and offers better performance compared to other energy storage devices in terms of life cycle and efficiency. However, it suffers from size and weight problems due to the nature of linear inductors.

A,1244,2004 321 NOx Treatment Using Inductive-Energy-Storage Pulsed Power Generator Fumito Endo* Non-member Weihua Jiang* Member Kiyoshi Yatsui * Member Naohiro Shimizu** Member Nitrogen oxide (NOx) removal is being studied for exhaust-gas treatment by pulsed discharge.A recently developed pulsed-power source using ...

Typical discharge curves of the inductive energy storage circuit with the vacuum arc thruster head. A solid aluminum electrolytic capacitor of approximately 2500 mF was used. According to the datasheet, the equivalent series resistance of the capacitor was approximately 0.01 O. Two inductors were used: an 83-turn coil wrapped around a ...

A pulsed magnet for the generation of fields up to 60 T using inductive energy storage has been built, tested and used for experiments at the Grenoble High Magnetic Field Laboratory (GHMFL). The pulse magnet system consists of a magnetic energy storage coil, made from aluminum of rectangular cross-section with a warm bore diameter of 1.1 m. Inside the warm bore is a ...

Pulsed power generation using solid-state linear transformer driver (LTD) with inductive energy storage has been experimentally studied. This is a feasibility study in order to explore this new approach by proving its operation principle and demonstrating its typical ...

capacitive energy storage (CES), with the basic principle of charging in parallel and discharging in series. In this article, we propose a solid-state Marx circuit using inductive energy storage, where inductors play the role of principal energy storage element. When combined with an opening switch, the inductor

Inductive energy storage refers to the method of storing energy in a magnetic field generated by an electric current flowing through a coil of wire. This process is fundamental to devices like superconducting magnetic energy storage systems, where energy can be stored and retrieved efficiently, providing rapid power delivery when needed. The efficiency and effectiveness of ...

The initial starting voltage spike as well as the energy to operate the vacuum arc are generated by a low mass (<300 g) inductive energy storage PPU which is controlled using +5 V level signals. The thrust-to-power ratio has been estimated to reach up to ?20 mN/W.

Characteristics of inductive energy storage system pulsed power generator with semiconductor opening switch (SOS) diodes are investigated with focusing on an energy transfer efficiency from the generator to the resistive load. Fast recovery diodes VMI K100UF were used as SOS and were connected in series and/or in parallel to realize a large current and a high output voltage. ...

Pulsed current generators using inductive energy storage (IES) can satisfy this demand, and there have been many studies on inductive pulsed current generators [12,13,14,15]. When the current flowing through the inductor changes, counter electromotive force will be generated at both ends of the inductor to maintain the original current amplitude.

The pulsed power generators using an inductive energy storage system are extremely compact and lightweight in comparison with those using a capacitive energy storage system. The reliable and repetitively operated opening switch is necessary to realize the inductive pulsed power generator. Here, the pulsed power generators using the inductive ...

Figure 2.27 shows a typical pulsed power generator using inductive energy storage and an opening switch. The capacitor, C 0, which is charged to V 0, is discharged through a pulse transformer, PT, and SiC-MOSFET as a power device, and the capacitor, C 1, is charged to 10 V 0 through the saturable transformer, ST, and the diode, D. The total ...

Pulsed power generators using an inductive energy storage system are extremely compact and lightweight in comparison with those using a capacitive energy storage system. A reliable opening switch operated repetitively is necessary to realize an inductive pulsed power generator. Two kinds of repetitively operated opening switches have been developed in Kumamoto University. ...

The pulse amplitude obtained on the load will be higher than that on the primary energy storage unit so as to get a higher voltage gain. In ref., a solid-state Marx circuit using inductive energy storage is proposed.

Inductance is added to each stage of Marx as the energy storage element and charged by the primary energy storage element capacitor.

the development of an inductive energy storage device [6], the com-bination of the inductive energy storage device and the trigger-less ignition method [16], and the use of a compact magnetic coil for col-limating and accelerating plasma [12,17]. In addition, Neumann et al. [18] demonstrated a Mg-fuelled centre-triggered pulsed cathodic arc

Solid-state Marx generator circuits have been widely studied in recent years. Most of them are based on capacitive energy storage (CES), with the basic principle of charging in parallel and discharging in series. In this article, we propose a solid-state Marx circuit using inductive energy storage, where inductors play the role of principal energy storage element. ...

Dc-to-Dc converter using inductive-energy storage for voltage transformation and regulation Abstract: A nondissipatively regulated dc-to-dc converter that operates very efficiently at high frequencies is presented. The circuit is characterized by a small number of power handling components, many of which perform multiple duties.

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An inductive energy storage switch system for the destruction of solid materials is reported. This is based on creating a pulsed electric breakdown in the solid dielectric, which then propagates in the specimen. This scheme provides a higher destruction effectiveness compared to a capacitive energy storage system. The higher energy efficiency is attributed to a different discharge ...

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