Inductive energy storage discharge

A review of applications of double-discharge circuits based on generators with inductive energy storage (IES) and semiconductor opening switches (SOS) for efficient excitation of different gas ...

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. ...

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 ...

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.

An atmospheric-pressure glow discharge has been generated using an inductive energy storage pulsed power generator. A pulsed high voltage with a short rise time of under 30 ns is employed to generate streamer discharges simultaneously at all tips of a needle-array electrode in nitrogen. The large number of streamer discharges prevent glow-to-arc transitions caused by ...

The implementation of VATs with battery-driven discharge presents a promising solution to enhance the performance and reliability of CubeSat propulsion systems while ensuring compliance with space sustainability guidelines. ... (2020) Design and demonstration of micro-scale vacuum cathode arc thruster with inductive energy storage circuit. Acta ...

Request PDF | Investigation for Optimization of an Inductive Energy Storage Circuit for Electrical Discharge Water Treatment | In this paper, we investigated a water treatment method that sprays ...

Generally, capacitive energy storage pulsed-power generators, for example a Blumlein generator, and magnetic compression and capacitive-transfer type of circuits, are used as a power supply of a pulse laser exited by discharge. Their operations are possible by using only a closing switch. Many practical and commercial switches have been already developed. ...

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. With switches turning off, inductances discharge in series to produce pulse on load.

Overview of Energy Storage Technologies. Léonard Wagner, in Future Energy (Second Edition), 2014. 27.4.3 Electromagnetic Energy Storage 27.4.3.1 Superconducting Magnetic Energy Storage. In a superconducting magnetic energy storage (SMES) system, the energy is stored within a magnet that is capable of releasing megawatts of power within a fraction of a cycle to ...

A design of high-current nanosecond generators with discharge of an inductive energy storage into a 15 O resistive load and test data are presented. Parameters of the opening switch made as an ...

A compact pulsed high-voltage generator has been developed for applications in pulsed gas discharges. Its operation principle is based on inductive energy storage and it uses a static induction thyristor as the opening switch. It is capable of generating pulsed high voltage of ~15 kV with pulse width of ~200 ns for load resistance of 1 kOmega. This generator can be ...

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 ...

The advantages of inductive energy storage (IES) generators for increasing the pulse energy, power, and duration for nitrogen laser pumped by self-sustained transverse discharge have been experimentally demonstrated. A theoretical model is developed and the operation of IES-pumped laser on nitrogen-electronegative gas mixtures is numerically ...

The calculation showed that the lasing energy can additionally increase by ~20% (to ~110 mJ) with PHYSICS OF WAVE PHENOMENA Vol. 17 No. 4 2009 The operation modes of nitrogen laser with transverse discharge pumping from inductive and capacitive energy storage generators were experimentally investigated and numerically simulated.

An efficient electric-discharge XeCl laser is developed, which is pumped by a self-sustained discharge with a prepulse formed by a generator with an inductive energy storage device and a ...

Inductive Energy Storage Xiaojing Ren, Taichi Sugai, Member, IEEE, Akira Tokuchi, Member, IEEE, ... inductive discharge occurs immediately, accompanied with the inductorcurrentreleasing into the resistive load [Fig. 3(c)].For an n-module circuit, all the inductors will connect in series to

Generators with inductive energy storage (GIES) are developed for laser application. Discharge and laser parameters in high-pressure gas mixtures are studied. It was shown that the IES generator produces high-voltage pre-pulse and sharp increase of discharge current which allows to form long-lived stable

discharge in different gas mixtures. Improve of both pulse duration and ...

Inductive energy storage devices, also known as pulse forming networks (PFN), are vital in the field of high-power pulsed technology. They store energy in a magnetic field created by electric current flowing through an inductor, or coil. ... Upon discharge, the stored energy is released in a quick pulse, hence their prominence in pulsed power ...

inductive storage systems require opening switches instead of closing switches for capacitive storage systems, being the last ones more common and with a higher variety, performance, ...

Nitrogen oxide (NOx) removal is being studied for exhaust-gas treatment by pulsed discharge. A recently developed pulsed-power source using inductive energy-storage was used as the high-voltage generator, which drives corona discharge in a small reactor cell. The whole system is very compact, lightweight, and low-cost. It is possible to be operated with ...

The cooling cost of high temperature superconductors is much lower than that of low temperature superconductors. By now, a few HTSPPTs have already been tested based on inductive energy storage system [6], [7], [8] and capacitive energy storage system [9].High energy transfer efficiency can be obtained by using a HTSPPT in a capacitor-based pulsed power ...

Figure 2 shows the energy transfer from primary energy storage capacitor to discharge and energy consumed in the reactor Eload and in the SOS ESOS at C=4 nF (primary energy storage capacitor), L=12.6 µH (secondary energy storage inductor) and VC0=-12 kV. The energy transfer from the primary energy storage capacitor to

A vacuum arc thruster is a type of micro-thruster based on pulsed ablative vacuum arc discharge. A simple inductive energy storage circuit in a vacuum arc thruster is particularly suitable for CubeSats because of its compact size and low cost. In practice, it is necessary to predict the thruster performance with the given design parameters. However, unlike the pulsed plasma ...

sion lines + Inductive storage discharge circuits + Resonant circuits with saturable inductors Contents ... Energy storage can be done in many different ways, where electrical energy stored in capacitors and magnetic energy stored in inductors have been widely employed. If one compares the energy storage density capabilities of electric and

method with an inductor storage power system was used for generating the pulsed plasma. This discharge method can significantly reduce input power. Thrust is mainly caused by high ...

system and volume discharge plasma in a laser with an inductive energy storage Aleksei N Panchenko et al-Efficient electric-discharge XeF laser pumped by a generator with an inductive energy storage Aleksei N Panchenko et al-This content was downloaded from IP address 157.55.39.91 on 09/07/2019 at 22:54

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