Powering Micro-Gap Plasma Zones with Power Transformers
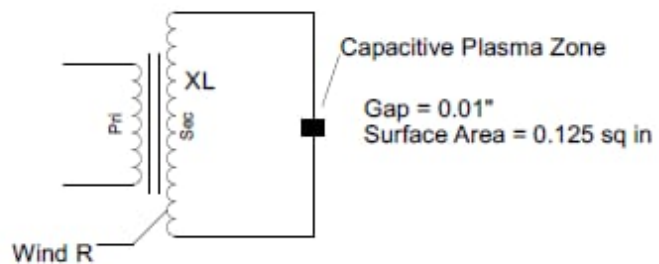
Powering micro Gap Plasma Zones With Power Transformers

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By Slade Outlaw

Capacitive Plasma Zone

Gap = 0.01"
Surface Area = 0.125 sq in

Wind R

A micro gap (0.010inch) with plasma ignited within will have a very low ohmic value as a load (dead short)

In most cases quality factor is considered for efficiency.. higher Q equates to less heat loss in the winds of a transformer

In conventional Current based power supplies the aim is to reduce all losses as heat When transforming power

This Typically leaves XL and R out of balance by a factor of 10 -100 times!

A High Q Output inductor Relies on the load to take on the job of regulation by maintaining a impeadance above the minium load impedance that the circuit can provide power to before overloading.

When transformers overload, current surges can occur due to inadequate regulation. This can lead to core oversaturation, reducing the primary winding's inductive reactance. As a result, the transformer loses its ability to regulate power flow effectively on the primary side

Conventional Transformer designs are not for dynamic loads like micro gaps going from non ignited high impedance load to ignited low impedance load states. They cannot maintain the Signal.

To maintain a plasma in a micro gap requires little power. It requires the ability to transmit a signal from a transformer that does not fail to continue to transmit under non ideal load conditons.

Q can be brought closer to 1 by Winding it with a resistive wire like Stainless steel 430F instead of copper.

When a transformers output Q= 1 The transformer technically cannot be overloaded by shorting out.. regardless of load impedance the transformer will continue to flow based on the wires resistance and transmit the power signals . It enhances the fidelity of voltage reducing overshoot and enhances control for physical resonant conditions such ions oscillating within a boundary at specific eV thresholds. Allowing more of a controlled force of power to be applied in a microgap..

Whats the Ideal Q factor for Producing plasma in a micro gap?

Qfactor = 2*pi*XL / Wind Resistance

Dissipation Factor= Wind Resistance / 2 *pi * XL

Q factor > 1 = Underdampened Oscillator
Q factor < 1 = Overdampened Osillactor
Q factor = 1 = Matched Oscillator XL = wire R

XL - (inductive Reactance) - the resistance to change electrons experience in relation to building and collapsing electromagnetic flux fields.

R - (Wire Resistance) - The reistance to change electrons experience in relation to conductivity of materials like copper, steel, carbon, etc.

Power can be regulated at the load by load impeadance or at the source by source   impeadance.

A circuit that regulates power at the load is suspect to overloading the source by the loads impedance dropping below a operable range..

Or a circuit that regulates power at the source is suspect to maintaining the same output to a load that has its impedance drop below optimal range.

Regulation at the source has its expense of loss in the transformer but a plasma has little to no impedance To provide for regulation so higher Q circuit fall suspect to overloading from the current spikes that would occur during plasma conditions..

By lowering Q toward a value of 1 you are increasing the operation bandwidth of a transformer and you are Enhancing its ability to self regulate. This will allow a transformer to drive voltage into a microgap as if the transformer were a voltage transducer.. Like a ultrasonic form of voltage within plasma zones but applied with electrical power in situations that if conventionalpower supplies connected to would fall suspect of overloading.