

New better build of the STEAP TPU 2021

by
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Slowly I am building a better TPU now that I understand the inner workings of this unit. Here I am going to document the build, first some photographs to help understand the toroid itself.

This is the collector core loops and the first solenoid wound over the top. The white/transparent looking wire is a piece of nylon wire guide as used for pulling wires through tubes, it is there as a support and former only.

The second and third coils are wound over the top of this in the same direction and the same length from start to finish (not wire length but coil length, same number of turns). The gap is 5cm, 2" which is for making connections without causing possible arc over due to HV.

All the core loops in the end are connected together to create the ground plate of the C1 capacitor, the inside of the solenoid coils form the other plate of C1.





Above shows both top and bottom toroids finished, each toroid measures 12,5cm ID and 18,5cm OD. This is not two TPU's but a reduction in diameter, the top and bottom solenoids are connected as though a continuation of each solenoid, such as a to a1 etc. the join is the centre tap connection (see schematic). All the loops (cores) are joined together forming the ground of the toroid ONLY. Shown on my capacitance meter is the "OVERALL" capacitance from the core to the coils, the individual capacitance from each solenoid layer is shown below.

- 1st coil (a,a1) to core is 0.340nF
- 2nd coil (c,c1) to core is 0.270nF
- 3rd coil (b,b1) to core is 0.235nF

Other measurements are inductance from the Mosfets "A" and "C" drains to the "B" drain.

0.067mH and 0.056mH accordingly and so giving a on its own an inductance of 0.011mH, I have measured this out of curiosity because this forms an inductive reactance delay between the "A" and "C" discharges.

The resonant frequency of the TPU is very difficult to measure with an oscilloscope, as many have found. By measurement and calculation an idea can be obtained.

- 0.340nF & 0.067mH gives us 1.054MHz
- 0.270nF & 0.067mH 1.183MHz
- 0.235nF & 0.067mH 1.263MHz

1kHz

- 0.340nF & 0.056mH gives us 1.153MHz
- 0.270nF & 0.056mH 1.294MHz
- 0.235nF & 0.056mH 1.387MHz

Now is it coincidence or not that the overall beat frequency by differential calculation between "a" and "a1" comes to exactly 1kHz.