Dusty Plasma Lab: SPARK Circuit and Frequency Testing

By: Marcus Bailey

Overall Motivation

Constructing a payload that seeks out Sodium in the upper atmosphere to prove a hypothesis. If there are any detections of Sodium (Na) at apogee; up to 150km above Earth’s atmosphere at high volumes, this will further prove that meteorites continue to add Sodium in Earth’s ocean.

Goals

• Use the HDSDR software to make sure that we were not interfering with Penn State’s frequency range before flight.
• Use Spitzer’s Resistivity to find the resistance of the plasma.
• Characterize the circuit to match impedances from the wire and plasma to limit feedback and resonance noise.

Setup

Spark Gap, HDSDR software, antenna, and vacuum

HDSDR Frequency Testing (Inside the Vacuum)

Circuit Modeling

Frequency range requirements were between 1MHz and 7MHz

Challenges/Goals

• This was a numerical alternative to find missing values.
• The Current was estimated.

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