

Brett Scott

Electrical Engineering

Year in School: Junior

Hometown: Washington, Mo.

Faculty Mentor: Dr. Scott Kovaleski, Electrical Engineering

Development of a RF Class E amplifier to power a ferroelectric plasma thruster

Brett Scott, Dustin Sullivan, & Scott Kovaleski

Class E amplifiers are a special class of electronic amplifiers which are highly efficient at delivering power at high frequencies. Class E amplifiers consist of a signal generator, switch, and two LC resonant circuits. The resonant circuits are tuned to a specific frequency, which requires the amplifier to be designed to a particular frequency. This amplifier is being developed to power the Ferroelectric Plasma Thruster (FEPT) which creates plasma when excited by a high voltage, high frequency signal. The FEPT has a piezoelectric resonance near 400 kHz, so an operating frequency of 375 kHz was selected for optimal performance. The goal of this project is to reduce the size and amount of equipment to operate the FEPT. Design goals require volume, weight, and electrical inputs to be kept to a minimum so that the amplifier and FEPT can be merged together into a small package.