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Effect of Plasma Modulation on the Corona of a Tesla Coil ROBERT CLAYTON, Princeton University, HANS SCHNEIDER, ANDREW ZWICKER, Princeton Plasma Physics Laboratory — Modulating an audio signal into a Tesla coil, one can create a plasma speaker. Documented use of plasma speakers dates back to 1900 with William Duddell's singing arc. In order to understand the mechanisms present in plasma speaker, and further the research that has been done by Nicholas Braithwaite, et al. in observing audio modulation in plasma (Visualizing Gas Heating from an RF Plasma Loudspeaker; 2008); a plasma speaker was constructed with a 4 MHz plasma frequency providing ∼10,000 volts in the secondary coil, which generates a 1-inch corona emitted from the electrode. The 4 MHz signal is outside of the audio range, therefore any audio signal can be modulated on top of the plasma without approaching the frequency of the plasma. A high speed video camera is used to look at plasma dynamics as a function of electrode shape and input power. Providing pure tones to modulate the speaker, the emitted corona will be analyzed at a frame rate at or above the frequency of the test signal to determine the effects of the modulation on the plasma. Audio quality will be studied with a frequency analyzer and correlated to plasma parameters.

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