

CLAIMS

1. A radio frequency (RF) generator system comprising:
a power source that generates an RF output signal applied to a load;
a sensor that detects spectral emissions from the load, the spectral emissions including at least one of harmonics and intermodulation distortion (IMD); and
a control module that varies a parameter of the RF output signal in accordance with one of the harmonics or the IMD detected in the spectral emissions, wherein the parameter is one of phase, frequency, or amplitude.
2. The RF generator system of claim 1 wherein the control module adjusts one of a current or a voltage of the RF signal to vary a width of an ion energy distribution (IED) or a phase of the RF signal to vary a peak of the IED.
3. The RF generator system of claim 1 wherein the load is an inductively coupled plasma (ICP) system.
4. The RF generator system of claim 3 wherein, the control module varies the RF output signal in accordance with a selected harmonic detected in the spectral emissions.
5. The RF generator system of claim 4 wherein the control module varies a current or a voltage of the RF output signal in order to control a width of an ion energy distribution (IED) or a phase of the RF signal to vary a peak of the IED .

6. The RF generator system of claim 1 wherein in a CCP system, the control module varies the RF output signal in accordance with a selected harmonic and a selected IMD detected in the spectral emissions.

7. The RF generator system of claim 6 wherein the control module varies a current or a voltage in the RF output signal in order to control a width of an ion energy distribution (IED) or a phase of the RF signal to vary a peak of the IED .

8. The RF generator system of claim 1 wherein the sensor is disposed in one of at an input to a matching network, at an output of a matching network, or within a RF generator.

9. The RF generator system of claim 1 wherein the load is a capacitively coupled plasma (CCP) system.

10. The RF generator system of claim 9 wherein the control module varies a current or a voltage of the RF output signal in order to control a width of an ion energy distribution (IED) or a phase of the RF output signal to vary a peak of the IED.

11. The RF generator system of claim 1 wherein in a CCP system, the control module varies the output signal in accordance with a selected harmonic and a selected IMD detected in the spectral emissions.

12. A method for controlling a radio frequency (RF) generator comprising:
detecting spectral emissions from a load, the spectral emissions including at least one a harmonic and intermodulation distortion (IMD); and
varying a parameter of an RF output signal of a RF power source in accordance with one of the harmonic or the IMD detected in the spectral emissions, wherein the parameter is one of phase, frequency, or amplitude.
13. The method of claim 12 further comprising adjusting one of a current or a voltage of the RF output signal to vary a width of an ion energy distribution (IED) or a phase of the output signal to vary a peak of the IED .
14. The method of claim 12 further comprising applying the RF output signal to a load in an inductively coupled plasma (ICP) system.
15. The method of claim 14 wherein in an ICP system, varying the RF output signal in accordance with at least one selected harmonic detected in the spectral emissions.
16. The method of claim 15 further comprising varying a current or a voltage of the RF output signal in order to control a width of an ion electron distribution (IED) or a phase of the RF signal to vary a peak of the IED.

17. The method of claim 14 wherein in a CCP system varying the RF output signal in accordance with a selected harmonic and a selected IMD detected in the spectral emissions.

18. The method of claim 17 further comprising varying a current or a voltage in the RF output signal in order to control a width of an ion energy distribution (IED) or a phase of the RF signal to vary a peak of the IED .

19. The method of claim 12 further comprising sensing at an input to a matching network, at an output of a matching network, or within an RF generator.

20. The RF generator system of claim 12 wherein the load is a capacitively coupled plasma (CCP) system.

21. The method of claim 12 further comprising applying the output signal to a load in a capacitively coupled plasma (CCP) system.

22. A radio frequency (RF) generator system comprising:
a power source that generates an RF output signal applied to a load;
a sensor that detects spectral emissions from the load, the sensor further detecting within the spectral emissions at least one of harmonics and intermodulation distortion (IMD) resulting from a second RF signal applied to the load or harmonics; and
a control module that varies a parameter of the RF output signal in accordance with the at least one of the harmonics or the IMD detected in the spectral emissions, wherein the parameter is one of phase, frequency, or amplitude.

23. The RF generator system of claim 22 wherein the control module adjusts one of a current or a voltage of the RF output signal to vary a width of an ion energy distribution (IED) or a phase of the RF signal to vary a peak of the IED.

24. The RF generator system of claim 22 wherein the load is an inductively coupled plasma (ICP) system.

25. The RF generator system of claim 24 wherein, the control module varies the RF output signal in accordance with a selected harmonic detected in the spectral emissions.

26. The RF generator system of claim 25 wherein the control module varies a current or a voltage of the RF output signal in order to control a width of an ion energy distribution (IED) or a phase of the RF signal to vary a peak of the IED .

27. The RF generator system of claim 26 wherein the control module varies a current or a voltage in the RF output signal in order to control a width of an ion energy distribution (IED) or a phase of the RF signal to vary a peak of the IED .

28. The RF generator system of claim 22 wherein the sensor is disposed in one of at an input to a matching network, at an output of a matching network, or within a RF generator.