

CLAIMS

1. A radio frequency (RF) generator comprising:
a RF power source; and
a RF power controller coupled to the RF power source, the RF power controller generating a control signal to vary a RF output from the RF power source, the RF power controller configured to operate in response to a trigger signal and introduce a frequency offset to the RF output,
wherein the frequency offset varies in accordance with an external RF output from an external RF generator.
2. The RF generator of claim 1, wherein the RF output is a source RF signal applied to a plasma chamber and the external RF output is a bias RF signal applied to the plasma chamber.
3. The RF generator of claim 1, wherein the RF power controller introduces the frequency offset to the RF output in accordance with a timing that varies in accordance with the trigger signal, wherein the trigger signal indicates a relative position of the external RF output.
4. The RF generator of claim 1, wherein the RF power controller obtains the frequency offset from memory or calculates the frequency offset.

5. The RF generator of claim 1, wherein the frequency offset includes a plurality of frequencies that the RF power controller introduces to the RF output in a predetermined order and timing in accordance with the trigger signal.

6. The RF generator of claim 1, wherein the RF power controller updates the frequency offset in accordance with the external RF output.

7. The RF generator of claim 1, wherein the frequency offset varies in accordance with an intermodulation distortion caused by the external RF output.

8. The RF generator of claim 1, wherein the frequency of the RF output is great than the external RF output.

9. The RF generator of claim 1, wherein the RF power controller further comprises a playback module, the playback module configured to detect the trigger signal, the playback module initiating introduction of a frequency offset to RF output.

10. The RF generator of claim 9, wherein the RF power controller further comprises a lookup table, the lookup table configured to store the frequency offset introduced by the playback module.

11. The RF generator of claim 10, wherein the RF power controller further comprises an update module, the update module configured to update the frequency offset in accordance with an electrical characteristic of the RF output.

12. The RF generator of claim 11 wherein the electrical characteristic is an impedance of a load connected to the RF generator.

13. The RF generator of claim 1 wherein the trigger signal is one of periodic, non-periodic, synchronous to a predetermined event, or asynchronous.

14. A radio frequency (RF) system comprising:
a first RF generator including a first power source generating a first RF signal applied to a load; and
a second RF generator including:
a second power source generating a second RF signal applied to the load;
and
a power controller coupled to the second power source, the power controller configured to respond to a trigger signal and to generate a control signal to vary the second RF signal, wherein the control signal selectively introduces a frequency offset into the second RF signal.

15. The RF system of claim 14, wherein the second RF signal is a source signal applied to the load and the first RF signal is a bias signal applied to the load, and wherein the load is a plasma chamber.

16. The RF system of claim 14, wherein the trigger signal varies in accordance with the first RF signal and wherein the power controller is configured to vary the control signal to introduce the frequency offset into the second RF signal in a position relative to the second RF signal.

17. The RF system of claim 14, wherein the power controller obtains the frequency offset from memory or calculates the frequency offset.

18. The RF system of claim 17, wherein the frequency offset includes a sequence of frequencies that the power controller introduces to the second RF signal in accordance with the trigger signal.

19. The RF system of claim 18, wherein the power controller introduces the sequence of frequencies to the second RF signal with a fixed or variable interval between each member of the sequence of frequencies.

20. The RF system of claim 14, wherein the power controller updates the frequency offset in accordance with a property of the second RF signal.

21. The RF system of claim 14, where in the RF controller generates the trigger signal in accordance with an impedance of the load.

22. The RF system of claim 14, wherein the RF controller further generates a trigger signal in accordance with phase-locking to impedance fluctuations in the load.

23. The RF system of claim 22, wherein the second RF generator further comprises a sensor for measuring an impedance and the load, the sensor generating a signal from which impedance fluctuations in the load are determined.

24. The RF system of claim 22, wherein the frequency offset reduces the impedance fluctuations in the load.

25. The RF system of claim 14 wherein the trigger signal is one of periodic, non-periodic, synchronous to a predetermined event, or asynchronous.

26. The RF system of claim 14 wherein the trigger signal is associated with a power control loop of the second RF generator.

27. A method for generating a radio frequency (RF) signal comprising:
coupling a power controller to a RF power source;
controlling a first RF generator to output a first RF output signal;
generating a control signal, the control signal varying an electrical characteristic of the first RF output signal;

varying the control signal to introduce a frequency offset into the first RF output signal, wherein the frequency offset varies in accordance with a second RF output signal from an external RF generator.

28. The method of claim 27 further comprising introducing the frequency offset into the first RF output signal in accordance with a trigger signal, wherein the trigger signal varies in accordance with one of the second RF output signal or an impedance fluctuation in a load receiving the first RF output signal.

29. The method of claim 28, wherein when the trigger signal varies in accordance with the second RF output signal, determining where in the first RF output signal the power controller introduces the frequency offset into the first RF output signal.

30. The method of claim 27, further comprising coupling the first RF output signal to a source electrode of a plasma chamber and coupling the second RF output signal applied to bias electrode of a plasma chamber.

31. The method of claim 27 further comprising updating the frequency offset in accordance with one of the output of the second RF output signal or an impedance fluctuation in a load coupled to the first RF generator.

32. The method of claim 31 further comprising updating the frequency offset in accordance with phase-locking to impedance fluctuations in the load.

33. The method of claim 31, wherein the frequency offset reduces the impedance fluctuations in the load.