

CLAUSES

1. A method comprising:
 - receiving a variable from a radio frequency (RF) system;
 - propagating the variable through a model of the RF system;
 - counting an output of the model for the variable to generate a count;
 - determining whether the count meets a count threshold;
 - generating a statistical value of the variable at the output of the model upon determining that the count meets the count threshold; and
 - sending the statistical value to the RF system to adjust the variable.
2. The method of clause 1, wherein the variable includes power, or frequency, or a voltage magnitude, or a current magnitude, or a phase between a complex voltage and a complex current, or a complex current, or a complex voltage, or a combination thereof.
3. The method of clause 1, wherein the RF system includes an RF generator.
4. The method of clause 1, wherein the model is a computer-generated model, wherein propagating the variable through the model comprises generating a directional sum of a value of the variable and of variable values associated with components of the model.
5. The method of clause 1, wherein the output includes multiple values of the variable.
6. The method of clause 5, wherein the statistical value includes a moving interquartile range of the values, or an interquartile range of the values, or a maximum of the values, or a

minimum of the values, or a mean of the values, or a median of the values, or a variance of the values, or a standard deviation of the values, or a moving mean of the values, or a moving median of the values, or a moving variance of the values, or a moving standard deviation of the values, or a mode of the values, or a moving mode of the values, or a combination thereof.

7. A method comprising:

receiving data associated with a variable from a radio frequency (RF) generator, the RF generator configured for generating an RF signal to be supplied via an impedance matching circuit to a plasma chamber, the variable being associated with an RF system, the RF system including the RF generator, impedance matching circuit, and the plasma chamber;

generating values output from a computer-generated model based on the received data;

counting an amount of the values output from the computer-generated model;

determining whether the amount exceeds a count threshold;

generating a statistical value from the values output from the computer-generated model in response to determining that the amount exceeds the count threshold;

sending the statistical value to the RF generator to adjust the RF signal produced by the RF generator.

8. The method of clause 7, wherein the adjusted RF signal is provided to the plasma chamber via an RF cable, the impedance matching circuit, and an RF transmission line, wherein the RF cable couples the RF generator to the impedance matching circuit, wherein the RF transmission line couples the impedance matching circuit to the plasma chamber.

9. The method of clause 7, wherein the variable includes power, or frequency, or a voltage magnitude, or a current magnitude, or a phase between a complex voltage and a complex current, or a complex current, or a complex voltage, or a combination thereof.
10. The method of clause 7, wherein the impedance matching circuit matches an impedance of a load with that of a source, wherein the source includes the RF generator and an RF cable coupling the RF generator to the impedance matching circuit, wherein the load includes the plasma chamber and an RF transmission line, the RF transmission line coupling the plasma chamber to the impedance matching circuit.
11. The method of clause 7, wherein the plasma chamber includes a chuck and an upper electrode facing the chuck.
12. The method of clause 7, wherein the variable includes a complex voltage and current at a point within the plasma system.
13. The method of clause 7, wherein the amount includes a number of values, wherein the statistical value includes a moving interquartile range of the values, or an interquartile range of the values, or a maximum of the values, or a minimum of the values, or a mean of the values, or a median of the values, or a variance of the values, or a standard deviation of the values, or a moving mean of the values, or a moving median of the values, or a moving variance of the values, or a moving standard deviation of the values, or a mode of the values, or a moving mode of the values, or a combination thereof.

- 14. The method of clause 7, further comprising decimating the data received after generating the statistical value.**
- 15. The method of clause 7, wherein generating the values at the output of the computer-generated model comprises propagating the received data thru components of the computer-generated model.**
- 16. A method comprising:**
- receiving data associated with a variable from a radio frequency (RF) generator, the RF generator for generating an RF signal to be supplied via an impedance matching circuit to a plasma chamber, the variable associated with an RF system, the RF system including the RF generator, impedance matching circuit, and the plasma chamber;**
 - generating values at an output of a computer-generated model based on the received data;**
 - counting an amount of the values output from of the computer-generated model;**
 - determining whether the amount exceeds a threshold;**
 - generating a statistical value from the values output from the computer-generated model in response to determining that the amount exceeds the threshold;**
 - determining whether the statistical value is outside a pre-determined range;**
 - adjusting the statistical value to be within the pre-determined range in response to determining that the statistical value is outside the pre-determined range; and**
 - sending the adjusted statistical value to the RF generator to control the RF generator to adjust the RF signal produced by the RF generator.**

- 17. The method of clause 16, wherein the adjusted RF signal is provided to the plasma chamber via an RF cable, the impedance matching circuit, and an RF transmission line, wherein the RF cable couples the RF generator to the impedance matching circuit, wherein the RF transmission line couples the impedance matching circuit to the plasma chamber.**
- 18. The method of clause 16, wherein the variable includes power, or frequency, or a voltage magnitude, or a current magnitude, or a phase between a complex voltage and a complex current, or a complex current, or a complex voltage, or a combination thereof.**
- 19. The method of clause 16, wherein the impedance matching circuit matches an impedance of a load with that of a source, wherein the source includes the RF generator and an RF cable coupling the RF generator to the impedance matching circuit, wherein the load includes the plasma chamber and an RF transmission line, the RF transmission line coupling the plasma chamber to the impedance matching circuit.**
- 20. The method of clause 16, wherein the plasma chamber includes a chuck and an upper electrode facing the chuck.**
- 21. The method of clause 16, wherein the variable includes a complex voltage and current at a point within the plasma system.**
- 22. A method comprising:**
receiving data associated with a variable from a radio frequency (RF) generator, the RF generator for generating an RF signal to be supplied via an impedance matching circuit to

a plasma chamber, the variable associated with an RF system, the RF system including the RF generator, impedance matching circuit, and the plasma chamber;
generating values at an output of a computer-generated model based on the received data;
counting an amount of the values output from the computer-generated model;
determining whether the amount exceeds a count threshold;
generating a statistical value from the values output from of the computer-generated model in response to determining that the amount exceeds the count threshold;
determining whether the statistical value is outside a pre-determined extent;
generating an indication of a fault in response to determining that the statistical value is outside the pre-determined extent; and
sending the fault indication to the RF generator.

23. The method of clause 22, further comprising:

determining whether the statistical value is within a pre-determined range;
adjusting the statistical value to be within the pre-determined range in response to determining that the statistical value is outside the pre-determined range; and
sending the adjusted statistical value to the RF generator to control the RF generator to generate an adjusted RF signal to provide to the plasma chamber via the impedance matching circuit.

24. The method of clause 22, wherein the adjusted RF signal is provided to the plasma chamber via an RF cable, the impedance matching circuit, and an RF transmission line, wherein the RF cable couples the RF generator to the impedance matching circuit, wherein the RF transmission line couples the impedance matching circuit to the plasma chamber.

~~25. The method of clause 22, wherein the variable includes power, or frequency, or real portion of load impedance, and or imaginary portion of the load impedance, or a voltage magnitude, or a current magnitude, or a phase between a complex voltage and a complex current, or wafer bias, or ion energy, or plasma potential, or a complex current, or a complex voltage, or load impedance, or a combination thereof.~~

26. The method of clause 22, wherein the variable includes a complex voltage and current at a point within the plasma system.