

CLAIMS

What is claimed is:

1. An apparatus to generate radio frequency (RF) power, comprising:
one or more RF power sources; and
5 a RF power distribution network configured to allocate power from the one or more RF power sources to individual input ports of a multi-station integrated circuit fabrication chamber,
the RF power distribution network additionally configured to apply one or more control parameters to bring about an imbalance in the power from the RF power
10 distribution network to the individual input ports of the multi-station integrated circuit fabrication chamber.
2. The apparatus of claim 1, wherein the RF power distribution network comprises one or more reactive circuit elements.
- 15 3. The apparatus of claim 2, further comprising a controller to adjust at least one value of the one or more reactive circuit elements responsive to identification of a disparity between a process condition and/or a process result at a first station of the multi-station integrated circuit fabrication chamber and a process condition and/or process result
20 at a second station of the multi-station integrated circuit fabrication chamber.
4. The apparatus of claim 3, wherein the process condition and/or the process result at the first station and the second station comprises a deposition process.
- 25 5. The apparatus of claim 4, wherein the deposition process comprises atomic layer deposition (ALD).
6. The apparatus of claim 4, wherein the deposition process comprises plasma-enhanced chemical vapor deposition (PECVD).
- 30 7. The apparatus of claim 3, wherein the process condition and/or the process result at the first station and the second station comprises an etching process.

8. The apparatus of claim 2, wherein the one or more reactive circuit elements comprises at least one capacitor or at least one inductor.

9. The apparatus of claim 8, wherein the one or more reactive circuit elements
5 comprises at least one capacitor, and wherein the one or more control parameters brings about modification of a value of the at least one capacitor to between about 10% and about 90% of a maximum value.

10. A multi-station integrated circuit fabrication chamber, comprising:
10 one or more input ports each configured to receive a signal from one or more radio frequency (RF) power sources;
a RF power distribution network, coupled to a corresponding one of the one or more input ports, the RF power distribution network comprising one or more reactive circuit elements; and
15 a controller coupled to the RF power distribution network and configured to modify a value of the one or more reactive circuit elements to give rise to an imbalance in RF power coupled from the one or more RF power sources to the multi-station integrated circuit fabrication chamber.

20 11. The multi-station integrated circuit fabrication chamber of claim 10, wherein the one or more reactive circuit elements comprises one or more capacitors.

12. The multi-station integrated circuit fabrication chamber of claim 11, wherein the controller is configured to modify a value of capacitance of the one or more capacitors
25 from between about 10% of a maximum value to about 90% of a maximum value.

13. The multi-station integrated circuit fabrication chamber of claim 10, wherein the controller is configured to modify the value of the one or more reactive circuit elements responsive to identification of a difference between a process condition and/or a
30 process result at a first station of the multi-station integrated circuit fabrication chamber and a process condition and/or a process result at a second station of the multi-station integrated circuit fabrication chamber.

14. The multi-station integrated circuit fabrication chamber of claim 13, wherein the process condition and/or the process result at the first station and the second station comprises a deposition process.

5 15. The multi-station integrated circuit fabrication chamber of claim 13, wherein the process condition and/or the process result at the first station and the second station comprises an etching process.

10 16. The multi-station integrated circuit fabrication chamber of claim 10, wherein the multi-station integrated circuit fabrication chamber comprises 4 process stations.

17. The multi-station integrated circuit fabrication chamber of claim 10, wherein the multi-station integrated circuit fabrication chamber comprises 2 process stations.

15 18. The multi-station integrated circuit fabrication chamber of claim 10, wherein the multi-station integrated circuit fabrication chamber comprises 8 process stations.

19. The multi-station integrated circuit fabrication chamber of claim 10, wherein the multi-station integrated circuit fabrication chamber comprises 16 process stations.

20

20. A control module, comprising:

a hardware processor coupled to a memory; and

a communications port configured to:

receive an indication that a process condition and/or a process result at a first

25 station of a multi-station integrated circuit fabrication chamber is different than a process condition and/or a process result at a second station of the multi-station integrated circuit fabrication chamber; and

transmit one or more instructions to a RF power distribution network to bring about an imbalance in radio frequency (RF) power coupled to the first station of the multi-
30 station integrated circuit fabrication chamber with respect to the RF power coupled to the second station of the multi-station integrated circuit fabrication chamber.

21. The control module of claim 20, wherein the one or more instructions operate to modify a value of one or more reactive elements of the RF power distribution network.

22. The control module of claim 21, wherein the one or more reactive elements comprise at least one capacitor, and wherein the one or more instructions operates to modify the value of the at least one capacitor to between about 10% and about 90% of a maximum value.

23. A method for controlling a fabrication process, comprising:
identifying that a process condition and/or a process result at a first station of a multi-station integrated circuit fabrication chamber is different than a process condition and/or a process result at a second station of the multi-station integrated circuit fabrication chamber; and

imbalancing radio frequency (RF) power coupled to the first station of the multi-station integrated circuit fabrication chamber with respect to the RF power coupled to the second station of the multi-station integrated circuit fabrication chamber.

24. The method of claim 23, wherein imbalancing comprises modifying a value of a reactive circuit element of RF power distribution network coupled to an input port of the multi-station integrated circuit fabrication chamber.

25. The method of claim 24, wherein modifying the value of the reactive circuit element comprises adjusting capacitance of the reactive circuit element from a nominal value of about 50% of a maximum value of capacitance to a value of between about 10% and about 90% of the maximum value of capacitance.

26. The method of claim 23, wherein imbalancing comprises generating at least about a 1% difference between RF power coupled to the first station of the multi-station integrated circuit fabrication chamber with respect to the second station of the multi-station integrated circuit fabrication chamber.

27. The method of claim 23, wherein the process condition and/or the process result at the first station and the second station comprises a deposition process.

28. The method of claim 23, wherein the process condition and/or the process result at the first station and the second station comprises an etching process.