CLAIMS

What is claimed is:

1. A plasma processing system for generating plasma to process at least a wafer, the plasma processing system comprising:

a first coil for conducting a first current for sustaining at least a first portion of the plasma;

a first current magnitude sensor coupled with the first coil for measuring a magnitude of a supplied current to provide a first magnitude measurement without measuring any phase angle of the supplied current, the supplied current being the first current or a total current that is used for providing a plurality of currents, the plurality of currents including the first current ~~if~~ when the supplied current is the total current; and

a first controller coupled with the first current magnitude sensor for generating a first command using at least one of the first magnitude measurement and information derived using the first magnitude measurement, without using information related to any phase angle measurement, and for providing the first command for controlling at least one of the magnitude of the supplied current and a magnitude of the total current.

2. The plasma processing system of claim 1 wherein the supplied current is the first current.

3. The plasma processing system of claim 1 further comprising:

a splitter for splitting the supplied current, the first coil being coupled to the first current magnitude sensor through the splitter; and

a second coil for conducting a second current for sustaining at least a second portion of the plasma, the second coil being coupled to the first current magnitude sensor through the splitter, the second current being among the plurality of currents, the supplied current being the total current.

4. The plasma processing system of claim 3 further comprising:

a second current magnitude sensor for measuring a magnitude of the first current to provide a second magnitude measurement, the first coil being coupled to the second current magnitude sensor;

a third current magnitude sensor for measuring a magnitude of the second current to provide a third magnitude measurement, the second coil being coupled to the second current magnitude sensor; and

a second controller coupled with the second current magnitude sensor and coupled with the third current magnitude sensor for generating a second command using at least one of the second magnitude measurement, the third magnitude measurement, information derived using the second magnitude measurement, and information derived using the third magnitude measurement, the second controller being coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and the magnitude of the second current.

5. The plasma processing system of claim 4 wherein the second controller generates the second command without using any phase angle measurement.

6. The plasma processing system of claim 1 further comprising:

a splitter for splitting the supplied current, the first coil being coupled to the first current magnitude sensor through the splitter; and

a set of coils for conducting a set of currents for sustaining at least a set of portions of the plasma other than the first portion of the plasma, the set of coils being coupled to the first current magnitude sensor through the splitter, the set of currents being among the plurality of currents, the supplied current being the total current, the set of coils including at least two coils.

7. The plasma processing system of claim 6 further comprising:

a second current magnitude sensor for measuring a magnitude of the first current to provide a second magnitude measurement, the first coil being coupled to the splitter through the second current magnitude sensor;

a set of current magnitude sensors, the set of current magnitude sensors being for measuring magnitudes of the set of currents to provide a set of magnitude measurements, each of the set of magnitude measurements being associated with one of the set of currents, each of the set of coils being coupled to one of the set of current magnitude sensors; and

a second controller coupled with the second current magnitude sensor and coupled with the set of current magnitude sensors for generating a second command using at least one of the second magnitude measurement, at least one of the set of

magnitude measurements, information derived using the second magnitude measurement, and information derived using the at least one of the set of magnitude measurements, the second controller being coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and one or more of the magnitudes the set of currents.

8. The plasma processing system of claim 1 further comprising:

a splitter for splitting the supplied current, the first coil being coupled with the splitter, the supplied current being the first current; and

a second coil for conducting a second current for sustaining at least a second portion of the plasma, the second coil being coupled to the splitter, the second current being among the plurality of currents.

9. The plasma processing system of claim 8 further comprising a second controller coupled with the first current magnitude sensor for generating a second command using at least one of the first magnitude measurement and information derived using the first magnitude measurement, the second controller being coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and a magnitude of the second current.

10. The plasma processing system of claim 8 further comprising:

a second current magnitude sensor for measuring a magnitude of the second current to provide a second magnitude measurement, the second coil being coupled to the second current magnitude sensor; and

a second controller coupled with the first current magnitude sensor and with the second current magnitude sensor for generating a second command using at least one of the first magnitude measurement, the second magnitude measurement, information derived using the first magnitude measurement, and information derived using the second magnitude measurement, the second controller being further coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and the magnitude of the second current.

11. The plasma processing system of claim 10 wherein the second controller generates the second command without using any phase angle measurement.

12. The plasma processing system of claim 1 further comprising:

a splitter for splitting the total current, the first coil being coupled to the splitter, the supplied current being the first current; and

a set of coils for conducting a set of currents for sustaining at least a set of portions of the plasma other than the first portion of the plasma, the set of coils being coupled to the splitter, the set of currents being among the plurality of currents, the set of coils including at least two coils.

13. The plasma processing system of claim 12 further comprising a second controller coupled with the first current magnitude sensor for generating a second command using at least one of the first magnitude measurement and information derived using the first magnitude measurement, the second controller being coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and one or more magnitudes of the set of currents.

14. The plasma processing system of claim 12 further comprising:

a set of current magnitude sensors for measuring magnitudes of the set of currents to provide a set of magnitude measurements, each of the set of coils being coupled to one of the set of current magnitude sensors; and

a second controller coupled with the first current magnitude sensor and coupled with the set of current magnitude sensors for generating a second command using at least one of the first magnitude measurement, at least one of the set of magnitude measurements, information derived using the first magnitude measurement, and information derived using the at least one of the set of magnitude measurements, the second controller being coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and one or more magnitudes of the set of currents.

15. A mechanism for performing current control in a plasma processing system, the plasma processing system including at least a first coil for conducting a first current for sustaining at least a first portion of plasma, the mechanism comprising:

a first current magnitude sensor coupled with the first coil for measuring a magnitude of a supplied current to provide a first magnitude measurement without measuring any phase angle of the supplied current, the supplied current being the first

current or a total current that is used for providing a plurality of currents, the plurality of currents including the first current if when the supplied current is the total current;, and

a first controller coupled with the current magnitude sensor for generating a first command using at least one of the first magnitude measurement and information derived using the first magnitude measurement, without using information related to any phase angle measurement, and for providing the first command for controlling at least one of the magnitude of the supplied current and a magnitude of the total current.

16. The mechanism of claim 15 wherein the supplied current is the first current.

17. The mechanism of claim 15 ~~wherein the plasma processing system~~ further including at least a second coil for conducting a second current for sustaining at least a second portion of the plasma, the mechanism further comprising:

a splitter for splitting the supplied current, the first coil being coupled to the first current magnitude sensor through the splitter, the second coil being coupled to the first current magnitude sensor through the splitter, the second current being among the plurality of currents, the supplied current being the total current;

a second current magnitude sensor for measuring a magnitude of the first current to provide a second magnitude measurement, the first coil being coupled to the second current magnitude sensor;

a third current magnitude sensor for measuring a magnitude of the second current to provide a third magnitude measurement, the second coil being coupled to the second current magnitude sensor; and

a second controller coupled with the second current magnitude sensor and coupled with the third current magnitude sensor for generating a second command using at least one of the second magnitude measurement, the third magnitude measurement, information derived using the second magnitude measurement, and information derived using the third magnitude measurement, the second controller being coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and the magnitude of the second current.

18. The mechanism of claim 17 wherein the second controller generates the second command without using any phase angle measurement.

19. The mechanism of claim 15 wherein the plasma processing system further including at least a second coil for conducting a second current for sustaining at least a second portion of the plasma, the mechanism further comprising:

a splitter for splitting the supplied current, the first coil being, coupled with the splitter, the supplied current being the first current, the second coil being coupled to the splitter, the second current being among the plurality of currents; and

a second controller coupled with the first current magnitude sensor for generating a second command using at least one of the first magnitude measurement and information derived using the first magnitude measurement, the second controller being coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and a magnitude of the second current.

20. The mechanism of claim 15 wherein the plasma processing system further including at least a second coil for conducting a second current for sustaining at least a second portion of the plasma, the mechanism further comprising:

a splitter for splitting the supplied current, the first coil being coupled with the splitter, the supplied current being the first current, the second coil being coupled to the splitter, the second current being among the plurality of currents;

a second current magnitude sensor for measuring a magnitude of the second current to provide a second magnitude measurement, the second coil being coupled to the splitter; and

a second controller coupled with the first current magnitude sensor and with the second current magnitude sensor for generating a second command using at least one of the first magnitude measurement, the second magnitude measurement, information related to the first magnitude measurement, and information related to the second magnitude measurement, the second controller being further coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and the magnitude of the second current.

21. A plasma processing system for generating plasma to process at least a wafer, the plasma processing system comprising:

a first coil for conducting a first current for sustaining at least a first portion of the plasma;

a first current magnitude sensor coupled with the first coil for measuring a magnitude of a supplied current to provide a first magnitude measurement without measuring any phase angle of the supplied current, the supplied current being the first current or a total current that is used for providing a plurality of currents, the plurality of currents including the first current when the supplied current is the total current;

a first controller coupled with the first current magnitude sensor for generating a first command using at least one of the first magnitude measurement and information derived using the first magnitude measurement, without using information related to any phase angle measurement, and for providing the first command for controlling at least one of the magnitude of the supplied current and a magnitude of the total current;

a splitter for splitting the supplied current, the first coil being coupled with the splitter, the supplied current being the first current;

a second coil for conducting a second current for sustaining at least a second portion of the plasma, the second coil being coupled to the splitter, the second current being among the plurality of currents; and

a second controller coupled with the first current magnitude sensor for generating a second command using at least one of the first magnitude measurement and information derived using the first magnitude measurement, the second controller being coupled with the splitter for providing the second command to the splitter for controlling at least one of the magnitude of the first current and a magnitude of the second current.