CLAIMS

1. A plasma system comprising:

a radio frequency (RF) generator;

a matchbox including an impedance matching circuit, the impedance matching circuit coupled to the RF generator via an RF cable;

a plasma reactor coupled to the matchbox via an RF line, the plasma reactor including a chuck, wherein the RF line forms a portion of an RF supply path, the RF supply path extending from the RF generator through the matchbox, and to the chuck; and

a phase adjusting circuit coupled to the RF supply path between the impedance matching circuit and the chuck, the phase adjusting circuit having a first end coupled to the RF supply path and a second end that is grounded; and

a controller coupled to the phase adjusting circuit, the controller for changing a parameter of the phase adjusting circuit to control an impedance of the RF supply path based on a tune recipe.

2. The plasma system of claim 1, wherein the impedance matching circuit matches an impedance of the RF generator and an RF cable system with an impedance of the plasma reactor and an RF transmission line, the RF transmission line coupling the impedance matching circuit to the plasma reactor, the RF transmission line including the RF line and a grounded RF tunnel, the RF cable system including the RF cable and an RF cable sheath.

3. The plasma system of claim 1, wherein the plasma reactor includes a lower electrode and an upper electrode, the upper electrode faces the lower electrode, the impedance

matching circuit configured to provide an RF signal to the phase adjusting circuit, the phase adjusting circuit configured to modify an impedance of the RF signal to generate another RF signal to provide to the plasma reactor via the RF line and when the lower electrode receives the other RF signal from the phase adjusting circuit, the plasma reactor configured to form plasma within the plasma reactor.

4. The plasma system of claim 1, wherein the RF line is surrounded by a grounded RF tunnel.

5. The plasma system of claim 1, wherein the phase adjusting circuit includes a variable capacitor, or a variable inductor, or a combination thereof.

6. The plasma system of claim 1, wherein the phase adjusting circuit is coupled to the RF supply path via a connection, the connection between an RF strap and an output of the impedance matching circuit.

7. The plasma system of claim 1, wherein the phase adjusting circuit is coupled to the RF supply path via a connection between a first RF strap and a second RF strap, wherein the first RF strap is coupled to an output of the impedance matching circuit.

8. The plasma system of claim 1, wherein the phase adjusting circuit is coupled to the RF supply path via a connection between the RF line and an RF strap, the RF strap coupled via another RF strap to an output of the impedance matching circuit.

9. The plasma system of claim 1, wherein the plasma reactor includes an RF cylinder that is connected to the chuck, wherein the phase adjusting circuit is coupled to the RF supply path via a connection of the RF cylinder, the RF cylinder coupled to the RF line via an RF coupling.

10. The plasma system of claim 1, wherein the matchbox has a housing, the phase adjusting circuit is located outside the housing and is coupled to the RF line.

11. The plasma system of claim 1, wherein the matchbox has a housing, the phase adjusting circuit is located within the housing and is coupled to an RF strap located within the housing, the RF strap coupling the impedance matching circuit to the RF line.

12. The plasma system of claim 1, wherein the RF supply path includes one or more RF straps coupled to the impedance matching circuit, wherein the plasma reactor includes an RF cylinder wherein the RF line is coupled to the RF cylinder via an RF coupling, wherein the RF supply path further includes the RF line, the RF coupling, and the RF cylinder, wherein the RF cylinder is coupled to the chuck.

13. The plasma system of claim 1, wherein the impedance is dependent on a capacitance, or an inductance, or a combination thereof of the phase adjusting circuit.

14. The plasma system of claim 1, wherein the impedance is controlled to achieve an etch rate, or a deposition rate, or a uniformity in etch rates, or a uniformity in deposition rates, wherein the etch rate, or the deposition rate, or the uniformity in etch rates, or the uniformity in deposition rates are specified within the tune recipe.

15. The plasma system of claim 1, wherein the controller is configured to control the phase adjusting circuit based on a value of a parameter measured on the RF supply path.

16. The plasma system of claim 1, wherein the phase adjusting circuit includes a filter for filtering an RF supply signal received from the impedance matching circuit and sending the filtered signal to the chuck.

17. The plasma system of claim 16, wherein the filter includes a variable capacitor that is coupled in series with a variable inductor or fixed inductor, wherein the variable inductor or fixed inductor is coupled to ground, wherein the variable capacitor is coupled to the RF supply path.

18. A system comprising a filter, the filter located between an impedance matching circuit and a plasma chamber, wherein the filter is coupled to ground, the filter used to control an impedance of a radio frequency (RF) signal to be delivered to the plasma chamber, the RF signal output from the impedance matching circuit towards the plasma chamber.

19. The system of claim 18, wherein the filter includes a capacitor, an inductor, or a combination thereof.

20. The system of claim 18, wherein the impedance matching circuit is configured to match an impedance of an RF generator and an RF cable system with an impedance of a plasma reactor and an RF transmission line, wherein the RF transmission line couples the impedance matching circuit to the plasma reactor, wherein the impedance matching circuit is

located within a matchbox, wherein the matchbox is coupled to the RF generator via the RF cable system, wherein the plasma reactor includes the plasma chamber.

21. The system of claim 18, wherein the plasma chamber includes a lower electrode and an upper electrode, the upper electrode faces the lower electrode.

22. The system of claim 18, wherein the impedance is dependent on a capacitance, or an inductance, or a combination thereof of the filter.

23. A method for controlling an impedance of an RS supply path, comprising:

receiving a radio frequency (RF) signal from an impedance matching circuit, the impedance matching circuit coupled to an RF generator of a plasma tool;

modifying an impedance of the RF signal to achieve a measurable factor; and

sending the modified RF signal via a portion of an RF supply path to a plasma reactor, the plasma reactor coupled to the impedance matching circuit.

24. The method of claim 23, wherein the RF signal received from the impedance matching circuit is generated when the impedance matching circuit matches an impedance of the RF generator and an RF cable system coupled to the RF generator with an impedance of the plasma reactor and an RF transmission line, the RF transmission line coupling the plasma reactor to the impedance matching circuit.

25. The method of claim 23, wherein the measurable factor includes an etch rate of etching a wafer when present within a plasma chamber of the plasma reactor, a deposition rate of depositing materials on the wafer when present within the plasma chamber, or

uniformity in etch rates of etching one or more wafers when present within the plasma chamber, or uniformity in deposition rates of depositing materials on one or more wafers when present within the plasma chamber, or a combination thereof.

26. The method of claim 23, wherein modifying the impedance comprises modifying a capacitance, an inductance, or a combination thereof of a filter, the filter coupled to the impedance matching circuit.