CLAIMS

1. A substrate processing chamber, comprising:

a chamber body and a chamber lid disposed on the chamber body defining a processing region within the chamber body beneath the lid;

a target disposed under the chamber lid;

a collimator disposed in the processing region;

a power source coupled to the collimator; and

a first set of magnets disposed around the chamber body above the collimator, wherein the first set of magnets have a total strength of about 500 to about 3000 gauss at the target surface and a second set of magnets disposed around the chamber body and below the collimator that together create a guidance magnetic field that is substantially orthogonal to the collimator.

2. The substrate processing chamber of claim 1, wherein the power source is one or more of a DC power source or an RF power source.

3. The substrate processing chamber of claim 1, wherein the power source is a bipolar power supply.

4. The substrate processing chamber of claim 1, wherein the power source is a bipolar pulsed DC power source.

5. The substrate processing chamber of claim 1, wherein the collimator is configured in bipolar mode.

6. The substrate processing chamber of claim 1, wherein the target is fabricated from aluminum, titanium, tantalum, tungsten, chromium, nickel, copper, cobalt, alloys thereof, or combinations thereof.

7. The substrate processing chamber of claim 1, further comprising:

an RF bias power coupled to a substrate support disposed in the processing

chamber.

8. The substrate processing chamber of claim 7, wherein the guidance magnetic field is substantially orthogonal to the substrate support.

9. The substrate processing chamber of claim 1, wherein the second set of magnets comprise a plurality of electromagnetic coils.

10. The substrate processing chamber of claim 1, further comprising:

a magnetron assembly disposed above the chamber lid.

11. A substrate processing chamber, comprising:

a chamber body and a chamber lid disposed on the chamber body defining a processing region within the chamber body beneath the lid;

a target disposed under the chamber lid;

a collimator disposed in the processing region under the lid;

a DC power source coupled to the collimator; and

a first set of magnets disposed around the chamber body above the collimator and a second set of magnets disposed around the chamber body and below the collimator, wherein the first set of magnets have a total strength of about 500 to about 3000 gauss at the target surface, wherein the second set of magnets have a total strength of about 0 to about 300 gauss measured about 7 inches away from the target, and wherein the first and second sets of magnets together create a guidance magnetic field that is substantially orthogonal to the collimator.

12. The substrate processing chamber of claim 11, wherein the DC power source is a bipolar pulsed DC power source.

13. The substrate processing chamber of claim 11, wherein the target is fabricated from aluminum, titanium, tantalum, tungsten, chromium, nickel, copper, cobalt, alloys thereof, or combinations thereof.

14. The substrate processing chamber of claim 11, further comprising:

a RF bias power coupled to a substrate support disposed in the processing chamber.

15. The substrate processing chamber of claim 14, wherein the guidance magnetic field is substantially orthogonal to the substrate support.

16. The substrate processing chamber of claim 11, wherein the second set of magnets comprise a plurality of electromagnetic coils.

17. A method of depositing material on a substrate, comprising:

supplying a gas mixture into a processing chamber;

applying a RF or DC source power to form a plasma from the gas mixture to sputter source material from a target disposed in the processing chamber;

applying a DC bias power to a collimator disposed in the processing chamber;

generating a guidance magnetic field substantially orthogonal to the collimator and having a total strength of about 500 to about 3000 gauss at the target surface using a first set of magnets disposed around the process chamber above the collimator and a second set of magnets disposed around the chamber body and below the collimator; and

depositing the source material onto the substrate.

18. The method of claim 17, wherein applying the DC bias power to the collimator further comprises:

alternatively pulsing a positive voltage and a negative voltage to the collimator.

19. The method of claim 17, wherein generating the guidance magnetic field comprises:

providing a first set of magnets disposed around the processing chamber above the collimator and a second set of magnets disposed around the processing chamber and below the collimator that together create the guidance magnetic field.

20. The substrate processing chamber of claim 1, wherein the second set of magnets have a total strength of about 0 to about 300 gauss measured about 7 inches away from the target.