CLAIMS

1. A plasma chamber, comprising:

a chamber body having a processing region therewithin;

a liner disposed on the chamber body, the liner surrounding the processing region;

a substrate support disposed within the liner;

a magnet assembly comprising a plurality of magnets disposed around the liner; and

a magnetic-material shield disposed around the liner, the magnetic-material shield encapsulating the processing region near the substrate support;

wherein the magnetic-material shield is of a cylindrical shape extending in a direction of a length of the chamber body and has a length of between 2 inches and 10 inches in the direction of the length of the chamber body;

wherein the magnetic material shield is disposed at a distance from the magnet assembly in the direction of the length of the chamber body; and

wherein the magnetic material shield is movable to provide further tunability for a plasma density profile in the processing region.

2. The plasma chamber of claim 1, wherein the magnetic-material shield comprises high permeability magnetic material having a relative permeability of 50,000 or more.

3. The plasma chamber of claim 2, wherein the high permeability magnetic material comprises nickel molybdenum alloy.

4. The plasma chamber of claim 1, further comprising:

a sleeve formed around the magnet assembly to confine magnetic fields generated the plurality of magnets to the processing region.

5. A shield for use in a plasma chamber, comprising:

a high permeability magnetic material having a relative permeability of 50,000 or more, wherein:

the high permeability magnetic material is configured to be positioned around a liner disposed within a chamber body of a plasma chamber;

the high permeability magnetic material is shaped cylindrical, extending in a direction of a length of the plasma chamber;

the high permeability magnetic material is configured to encapsulate a processing region of the plasma chamber; and

the high permeability magnetic material is configured to be movable relative to the processing region of the plasma chamber to provide further tunability for a plasma density profile in the processing region.

6. The shield of claim 5, wherein the high permeability magnetic material comprises nickel molybdenum alloy.

7. The shield of claim 5, wherein the high permeability magnetic material is shaped to have a length of between 2 inches and 10 inches in the direction of the length of the chamber body.

8. The plasma chamber of claim 5, wherein the high permeability magnetic material is positioned at a distance from a magnet assembly disposed around the liner in the direction of the length of the chamber body.

9. A process chamber, comprising:

a lid assembly;

a chamber body coupled to the lid assembly by a spacer, the spacer and the chamber body defining a processing region;

a rotatable magnet assembly coupled to the spacer outside of the processing region;

a substrate support disposed and movable within the processing region, wherein the substrate support is coupled to an actuator configured to raise and lower the substrate assembly; and

a magnetic-material shield disposed around the spacer, the magnetic-material shield encapsulating the processing region near the substrate support.

10. The process chamber of claim 9, wherein the lid assembly comprises a heat exchanger.

11. The process chamber of claim 9, wherein the spacer comprises a plurality of heater elements.

12. The process chamber of claim 9, wherein the spacer comprises a liner surrounding the processing region.

13. The process chamber of claim 9, wherein the rotatable magnet assembly comprises a plurality of magnets.

14. The process chamber of claim 9, wherein the magnetic-material shield comprises high permeability magnetic material having a relative permeability of 50,000 or more.

15. The process chamber of claim 9, wherein the magnetic-material shield has a length of between 2 inches and 10 inches in a direction of the length of the chamber body.

16. The process chamber of claim 9, wherein the magnetic-material shield is positioned at a distance from the rotatable magnet assembly in a direction of the length of the chamber body.