Claims

1. An ion source, comprising:

a plasma chamber to house a plasma;

an extraction assembly, disposed along a side of the plasma chamber, and comprising at least one extraction aperture elongated along a first direction; and

an antenna assembly, the antenna assembly extending through the plasma chamber, along a first axis, the antenna assembly comprising:

a dielectric enclosure; and

a plurality of conductive antennae, extending along the first axis within the dielectric enclosure, wherein the plurality of conductive antennas are movable with respect to one another within the dielectric enclosure along at least a second direction perpendicular to the first direction.

2. The ion source of claim 1, wherein the at least one extraction aperture comprises a plurality of extraction apertures, elongated along the first direction.

3. The ion source of claim 1, wherein the extraction assembly comprises an extraction plate, disposed within a first plane, and wherein the plurality of conductive antennae have an arcuate shape, within a second plane, parallel to the first plane.

4. The ion source of claim 3, wherein the plurality of conductive antennae comprise a pair of antennae, wherein the pair of antennae are disposed closer to one another in a middle portion.

5. The ion source of claim 3, wherein the plurality of conductive antennae comprise a pair of antennae, wherein the pair of antennae are disposed closer to one another at respective distal ends of the pair of antennae.

6. The ion source of claim 1, further comprising a ferromagnetic insert assembly, disposed within the dielectric enclosure.

7. The ion source of claim 6, wherein plurality of conductive antennae comprise a pair of antennae, and wherein the ferromagnetic insert assembly extends between a first antenna of the pair of antennae and a second antenna of the pair of antennae.

8. The ion source of claim 1, further comprising a movement mechanism, coupled to move at least one antenna of the plurality of conductive antennae with respect to another antenna of the plurality of antennae, within the dielectric enclosure.

9. A processing system, comprising:

a plasma chamber to house a plasma;

an extraction assembly, disposed along a side of the plasma chamber, and comprising at least one extraction aperture elongated along a first direction;

an antenna assembly, the antenna assembly extending through the plasma chamber, along a first axis, the antenna assembly comprising:

a dielectric enclosure; and

a plurality of conductive antennae, extending along the first axis within the dielectric enclosure, wherein the plurality of conductive antennas are movable with respect to one another within the dielectric enclosure along at least a second direction perpendicular to the first direction;

a process chamber, adjacent to the extraction assembly, and comprising a substrate stage, scannable along a scan direction, perpendicular to the first axis; and

a power generator, connected to the antenna assembly.

10. The processing system of claim 9, wherein the at least one extraction aperture is elongated along a first direction, and wherein the plurality of conductive antennae are movable with respect to one another within the dielectric enclosure along at least a second direction, perpendicular to the first direction.

11. The processing system of claim 10, wherein the at least one extraction aperture comprises a plurality of extraction apertures, elongated along the first direction.

12. The processing system of claim 9, wherein the extraction assembly comprises an extraction plate, disposed within a first plane, and wherein the plurality of conductive antennae have an arcuate shape, within a second plane, parallel to the first plane.

13. The processing system of claim 12, wherein the plurality of conductive antennae comprise a pair of antennae, wherein the pair of antennae are disposed closer to one another in a middle portion.

14. The processing system of claim 12, wherein the plurality of conductive antennae comprise a pair of antennae, wherein the pair of antennae are disposed closer to one another at respective distal ends of the pair of antennae.

15. The processing system of claim 9, further comprising a ferromagnetic insert assembly, disposed within the dielectric enclosure.

16. The processing system of claim 15, wherein the plurality of conductive antennae comprise a pair of antennae, and wherein the ferromagnetic insert assembly extends between a first antenna of the pair of antennae and a second antenna of the pair of antennae.

17. The processing system of claim 9, further comprising a movement mechanism, coupled to move at least one antenna of the plurality of conductive antennae with respect to another antenna of the plurality of antennae, within the dielectric enclosure.

18. An antenna assembly for an inductively coupled ion source, comprising;

a dielectric enclosure, extending along a first direction from a first end to a second end;

a first conductive antenna, extending through the dielectric enclosure, from the first end to the second end; and

a second conductive antenna, extending through the dielectric enclosure, from the first end to the second end,

wherein at least one of the first conductive antenna and the second conductive antenna are movable within the dielectric enclosure, along at least a second direction, perpendicular to the first direction.

19. The antenna assembly of claim 18, further comprising a ferromagnetic insert assembly, disposed within the dielectric enclosure.