

CLAIMS

1. An apparatus for reducing microwave leakage from a process chamber, comprising:

a slit valve with a slit valve gate; and

a slot perpendicular to a gap between the slit valve and the slit valve gate, the slot having a bottom with a varying surface such that a range of microwave frequencies resonate in the slot.

2. The apparatus of claim 1, wherein the varying surface has a linear slope with a highest point causing resonance of a highest resonating frequency of the slot and a lowest point causing resonance of a lowest resonating frequency of the slot.

3. The apparatus of claim 1, wherein the varying surface has serrations with highest peaks of the serrations causing resonance of a highest resonating frequency of the slot and valleys of the serrations causing resonance of a lowest resonating frequency of the slot.

4. The apparatus of claim 3, wherein the serrations are formed separately from the slot and inserted into the slot.

5. The apparatus of claim 1, wherein a width of the slot is greater than zero and less than a wavelength of a highest resonant frequency of the slot.

6. The apparatus of claim 1, wherein the slot is formed in the slit valve.

7. The apparatus of claim 6, wherein the slot has an L-shape where a total length of the slot through a mid-point of the L-shape is a quarter of a wavelength of a frequency that resonates in the slot.

8. The apparatus of claim 6, wherein the slot is straight and formed into material of the slit valve.

9. The apparatus of claim 6, wherein the slot is straight and formed by a gap between material of the slit valve and a second element inserted into an opening of the slit valve.

10. The apparatus of claim 1, wherein the slot is formed inward of a vacuum seal for the slit valve gate or formed behind a vacuum seal for the slit valve gate.

11. An apparatus for reducing microwave leakage from a process chamber, comprising:

the process chamber having a substrate support in an inner volume;

a slit valve disposed in a wall of the process chamber, the slit valve having a slit valve opening for inserting and removing substrates from the substrate support and a slit valve gate for sealing the process chamber; and

a recess cavity in the slit valve that surrounds the slit valve opening, the recess cavity having a varying surface on a bottom of the recess cavity.

12. The apparatus of claim 11, wherein the recess cavity is located inward of vacuum gasket for the slit valve gate towards the opening of the slit valve gate.

13. The apparatus of claim 11, wherein the varying surface has serrations with highest peaks of the serrations causing resonance of a highest resonating frequency of the recess cavity and valleys of the serrations causing resonance of a lowest resonating frequency of the recess cavity.

14. The apparatus of claim 11, wherein the recess cavity has a width of greater than zero to less than a wavelength of a highest resonant frequency of the recess cavity.

15. An apparatus for reducing microwave leakage from a process chamber, comprising:

the process chamber having a substrate support in an inner volume;

a slit valve disposed on a wall of the process chamber, the slit valve having a slit valve opening for inserting and removing substrates from the substrate support and a slit valve gate for sealing the process chamber;

a first separable element having an annular shape inserted into the slit valve opening and mating with the slit valve, the first separable element forming one wall of a choke cavity, the slit valve forming another wall of the choke cavity and a bottom surface of the choke cavity; and

a second separable element having an annular shape inserted into the choke cavity with a bottom surface mating with the slit valve at the bottom surface of the choke cavity, the second separable element having serrations on a top surface providing a varying bottom surface of the choke cavity.