What is claimed is:

## CLAIMS

1. An assembly of a first RF component and a second RF component in a mass spectrometer, the first RF component comprising a first set of electrodes and the second RF component comprising a second set of electrodes, wherein the RF components are located and aligned end-to-end to one another, and wherein a transverse dimension of the electrodes of the first set is smaller than that of the electrodes of the second set, the assembly further comprising a conductive electric field screen located at ~~an~~a radial outer periphery of the first set of electrodes and facing the electrodes of the second set such that it poses substantially no geometric restriction on a space between end-faces of the first and second set of electrodes, as to reduce RF electric field cross-talk between the electrodes of the first set and those of the second set.

2. The assembly of claim 1, wherein the electric field screen is maintained substantially at a DC bias potential applied uniformly to the electrodes of the first set.

3. The assembly of claim 1, wherein the electric field screen is one of grounded and supplied with at least one of tunable RF and tunable DC voltages.

4. The assembly of claim 3, wherein at least one of the tunable RF and tunable DC voltages supplied to the electric field screen is coordinated with at least one of RF and DC voltages supplied to the first or second set of electrodes.

5. The assembly of any one of claims 1 to 4, wherein the first RF component is one of a multipole mass analyzer, a pre/post-filter, a multipole ion guide, a multipole collision cell, and a multipole ion trap and the second RF component is one of a multipole mass analyzer, a pre/post-filter, a multipole ion guide, a multipole collision cell, and a multipole ion trap.

6. The assembly of any one of claims 1 to 5, wherein a longitudinal distance between the first and second sets of electrodes is smaller than an inscribed

electrodes in the first set, each two-dimensional member being associated with one of the electrodes of the first set.

15. The assembly of any one of claims 1 to 14, wherein at least one non-conductive spacer is located between an outer circumference of the electrodes of the first set and the electric field screen.

16. The assembly of any one of claims 1 to 15, wherein an end-face of a front end of the electrodes of the first set partially overlaps with that of the electrodes of the second set when viewed along an axis of the assembly.

17. The assembly of any one of claims 1 to 16, wherein the first set and the second set of electrodes each comprise one of four, six, eight, ten, and twelve electrodes to form a quadrupole, hexapole, octopole, decapole, and dodecapole configuration, respectively.

18. A mass spectrometry apparatus comprising:

a first radio frequency (RF) component having a first set of elongate electrodes;

a RF component having a second set of elongate electrodes aligned end-to-end with the first electrode set and having a transverse dimension smaller than that of the first electrode set; and

a conductive electric field screen located at ~~an~~a radial outer periphery of the first electrode set adjacent to the second electrode set such that it poses substantially no geometric restriction on a space between end-faces of the first and second set of electrodes and reduces RF electric field cross-talk between the electrode sets.

What is claimed is:

## CLAIMS

1. An assembly of a first RF component and a second RF component in a mass spectrometer, the first RF component comprising a first set of electrodes and the second RF component comprising a second set of electrodes, wherein the RF components are located and aligned end-to-end to one another, and wherein a transverse dimension of the electrodes of the first set is smaller than that of the electrodes of the second set, the assembly further comprising a conductive electric field screen located at a radial outer periphery of the first set of electrodes and facing the electrodes of the second set such that it poses substantially no geometric restriction on a space between end-faces of the first and second set of electrodes, as to reduce RF electric field cross-talk between the electrodes of the first set and those of the second set.

2. The assembly of claim 1, wherein the electric field screen is maintained substantially at a DC bias potential applied uniformly to the electrodes of the first set.

3. The assembly of claim 1, wherein the electric field screen is one of grounded and supplied with at least one of tunable RF and tunable DC voltages.

4. The assembly of claim 3, wherein at least one of the tunable RF and tunable DC voltages supplied to the electric field screen is coordinated with at least one of RF and DC voltages supplied to the first or second set of electrodes.

5. The assembly of any one of claims 1 to 4, wherein the first RF component is one of a multipole mass analyzer, a pre/post-filter, a multipole ion guide, a multipole collision cell, and a multipole ion trap and the second RF component is one of a multipole mass analyzer, a pre/post-filter, a multipole ion guide, a multipole collision cell, and a multipole ion trap.

6. The assembly of any one of claims 1 to 5, wherein a longitudinal distance between the first and second sets of electrodes is smaller than an inscribed

radius of an inner width formed in between the electrodes of one of the first set and the second set.

7. The assembly of any one of claims 1 to 6, wherein the inner width formed in between the electrodes of the first set is different in one of shape and dimension from that formed in between the electrodes of the second set.

8. The assembly of any one of claims 1 to 7, wherein the opposing front ends of the electrodes of at least one of the first set and second set are modified by one of being hollow and being recessed at a side facing away from the inner width formed in between the electrodes, as to decrease the conductive mass and thereby reduce a cross-talk magnitude.

9. The assembly of any one of claims 1 to 8, wherein a side of the electric field screen facing the electrodes of the second set is positioned about flush with an end-face of the electrodes of the first set.

10. The assembly of any one of claims 1 to 9, wherein the electric field screen is one of an integral sheet member and mesh member, having a central aperture with a dimension as to accommodate the electrodes of the first set.

11. The assembly of claim 10, wherein the central aperture resembles a clover leaf with a number of concave recesses that corresponds to a number of electrodes to be accommodated.

12. The assembly of claim 11, wherein the recesses and the electrodes of the first set are arranged in relation to one another such that the recesses lie between the electrodes of the first set.

13. The assembly of claim 10, wherein the central aperture is one of circular and rectangular.

14. The assembly of any one of claims 1 to 9, wherein the electric field screen comprises a number of two-dimensional members that is equal to a number of

electrodes in the first set, each two-dimensional member being associated with one of the electrodes of the first set.

15. The assembly of any one of claims 1 to 14, wherein at least one non-conductive spacer is located between an outer circumference of the electrodes of the first set and the electric field screen.

16. The assembly of any one of claims 1 to 15, wherein an end-face of a front end of the electrodes of the first set partially overlaps with that of the electrodes of the second set when viewed along an axis of the assembly.

17. The assembly of any one of claims 1 to 16, wherein the first set and the second set of electrodes each comprise one of four, six, eight, ten, and twelve electrodes to form a quadrupole, hexapole, octopole, decapole, and dodecapole configuration, respectively.

18. A mass spectrometry apparatus comprising:

a first radio frequency (RF) component having a first set of elongate electrodes;

a RF component having a second set of elongate electrodes aligned end-to-end with the first electrode set and having a transverse dimension smaller than that of the first electrode set; and

a conductive electric field screen located at a radial outer periphery of the first electrode set adjacent to the second electrode set such that it poses substantially no geometric restriction on a space between end-faces of the first and second set of electrodes and reduces RF electric field cross-talk between the electrode sets.