CLAIMS:

1. A sample analysis apparatus comprising:

(i) an ion source configured to generate an ion from a sample input into the particle detection apparatus;

(ii) an ion detector having an input configured to receive an ion generated from an ion source; and

(iii)a barrier or partial barrier positioned between the ion source and the ion detector configured to alter the direction of a contaminant with which an ion generated by the ion source is comingled but not to alter the direction of ions from the ion source, the alteration in direction being sufficient so as to separate the ion from the contaminant

wherein the sample analysis apparatus is configured such that a contaminant comingling with an ion generated by the ion source and flowing in the same general direction as the ion, is inhibited or prevented from entering the detector input by the barrier or partial barrier.

2. The sample analysis apparatus of claim 1, comprising ion direction alteration means configured to alter the direction of an ion generated by the ion source and conveyed in a direction away from the ion source, the alteration in direction being sufficient so as to separate the ion from the contaminant or at least decrease the concentration of the contaminant in a space about the ion.

3. The sample analysis apparatus of claim 2, wherein the ion direction alteration means acts to deflect the path of an ion generated by the ion source and conveyed in a direction away from the ion source.

4. The sample analysis apparatus of claim 3, wherein the deflection is caused by the establishment of an electro-magnetic field about the ion detection alteration means.

5. The sample analysis apparatus of any one of claims 1 to 4, wherein the barrier or partial barrier is configured to allow passage of an ion generated by the ion source but prevent or inhibit the passage of a contaminant.

6. The sample analysis apparatus of any one of claims 1 to 5, wherein the barrier or partial barrier acts to deflect a contaminant away from the ion detector input.

7. The sample analysis apparatus of any one of claims 1 to 6, wherein the barrier or partial barrier comprises a discontinuity configured to allow passage of an ion generated by the ion source but prevent or inhibit the passage of a contaminant.

8. The sample analysis apparatus of any one of claims 1 to 7, wherein the barrier or partial barrier is substantially dedicated to the purpose of allowing passage of an ion generated by the ion source but preventing or inhibiting the passage of a contaminant.

9. The sample analysis apparatus of any one of claims 1 to 8, comprising at least 2, 3, or more barriers or partial barriers, each of the barriers or partial barriers being in at least a partially overlapping or stacked arrangement.

10. The sample analysis apparatus of any one of claims 1 to 9, wherein the detector is configured or positioned or orientated such that an ion generated by the ion source and conveyed along a substantially linear path from the ion source requires deviation from its linear path in order to enter the detector input.

11. The sample analysis apparatus of any one of claims 1 to 10, wherein the detector is configured or positioned or orientated such that no line of sight is established between the ion source and the detector input.

12. The sample analysis apparatus of any one of claims 1 to 11, wherein the detector is configured or positioned or orientated such that no line of sight is established between an origin of the sample carrier gas stream and the detector input.

13. The sample analysis apparatus of any one of claims 1 to 12, wherein the detector input faces generally away from the ion source, or does not face generally toward the ion source.

14. The sample analysis apparatus of any one of claim 1 to 13 comprising: a vacuum chamber which encloses the ion source and the detector, the vacuum chamber having a chamber outlet port in gaseous communication with a vacuum pump so as to allow a vacuum to be established in the vacuum chamber, wherein the chamber outlet port is configured or positioned or oriented such that when the vacuum pump is in operation a contaminant comingling with an ion generated by the ion source and flowing in the same general direction as the ion, partitions into the chamber outlet port in preference to the detector.

15. The sample analysis apparatus of claim 14, wherein the barrier or partial barrier extends between the chamber outlet port and the detector input.

16. The sample analysis apparatus of any one of claims 1 to 15, wherein the detector is at least partially enclosed so as to prevent or inhibit a contaminant from contacting an electron emissive surface or an electron collector/anode surface of the detector.

17. The sample analysis apparatus of any one of claims 1 to 16, wherein the detector has one or more associated shields configured to deflect a sample carrier gas stream away from the detector input.

18. The sample analysis apparatus of any one of claims 1 to 17, comprising a sample inlet port through which a sample carrier gas and sample pass, the sample inlet port configured to direct a stream of sample carrier gas and sample toward the ion generator.