CLAIMS

1. A source assembly comprising a source configured to couple to a vacuum port of a vacuum chamber of an instrument comprising a first pin and a second pin each extending radially from the instrument, the source assembly comprising:

a moveable component comprising a circumferential slot;

a stationary component comprising the source, in which the source comprises a plurality of lenses;

in which the stationary component further comprises a slot that is configured to receive the first in and the second in of the instrument into the slot of the stationary component to align the source in the instrument when the first and second pins engage the slot of the stationary component;

in which the moveable component is configured to provide an axial force to the stationary component upon rotational movement of the moveable component in a first direction by compression of a spring, in which the moveable component is further configured to release the provided axial force upon rotational movement of the moveable component in a second direction opposite the first direction; and

in which rotational movement of the moveable component in the first direction is configured to engage the second pin in the circumferential slot of the moveable component to lock the stationary component in place and compress the spring to thereby provide a substantially fluid tight seal between the source and the vacuum chamber.

2. The source assembly of claim 1, in which the spring is present in a spring loaded center shaft.

3. The source assembly of claim 1, in which the slot of the stationary component is configured to position the source radially along a centerline of the instrument.

4. The source assembly of claim 1, in which the slot of the stationary component and the circumferential slot of the moveable component are aligned prior to rotation of the moveable component.

5. The source assembly of claim 4, in which the stationary component is configured to

insert into the instrument until the second pin of the instrument contacts the circumferential slot of the moveable component.

6. The source assembly of claim 1, in which the stationary component further comprises a seal configured to contact a sealing face of the vacuum chamber when the stationary component is locked in place.

7. The source assembly of claim 1, in which the vacuum port of the instrument is configured to not rotate when the moveable component is moved from the first position to the second position.

8. The source assembly of claim 1, in which the spring comprises detents.

9. The source assembly of claim 1, in which the spring comprises a spring loaded plunger.

10. The source assembly of claim 1, in which the moveable component comprises a cam.

11. The source assembly of claim 1, in which the source is an ion source or an electron source.

12. The source assembly of claim 1, further comprising a plunger configured to align the stationary component and the moveable component when the source assembly is removed from the instrument.

13. The source assembly of claim 12, in which the plunger is configured to provide a resistive force between the moveable component and the stationary component.

14. The source assembly of claim 13, in which the moveable component comprises a detent configured to receive the plunger.

15. The source assembly of claim 13, in which the moveable component is configured to position the circumferential slot of the moveable component perpendicular to the slot of the

stationary component prior to rotational movement of the moveable component in the first direction.

16. The source assembly of claim 1, in which the moveable component is configured to position the circumferential slot of the moveable component perpendicular to the slot of the stationary component prior to rotational movement of the moveable component in the first direction.

17. A source assembly comprising a source configured to couple to a vacuum port of a vacuum chamber of an instrument comprising a first pin and a second pin each extending radially from the instrument the source assembly comprising:

a moveable component comprising a circumferential slot;

a stationary component comprising the source, in which the source comprises a plurality of lenses;

a plunger between the moveable component and the stationary component and configured to provide a resistive force between the moveable component and the stationary component;

in which the stationary component further comprises a slot that is configured to receive the first pin and the second pin of the instrument into the slot of the stationary component to align the source in the instrument when the first and second pins engage the slot of the stationary component, in which the plunger is configured to align the slot of the stationary component with the circumferential slot of the moveable component when the source assembly is removed from the instrument;

in which the moveable component is configured to provide an axial force to the stationary component upon rotational movement of the moveable component in a first direction by compression of a spring, in which the moveable component is further configured to release the provided axial force upon rotational movement of the moveable component in a second direction opposite the first direction; and

in which rotational movement of the moveable component in the first direction is configured to engage the second pin in the circumferential slot of the moveable component to lock the stationary component in place and compress the spring to thereby provide a substantially fluid tight seal between the source and the vacuum chamber.

18. The source assembly of claim 17, in which the spring is present in a spring loaded center shaft.

19. The source assembly of claim 17, in which the stationary component is configured to insert into the instrument until the second pin of the instrument contacts the circumferential slot of the moveable component.

20. The source assembly of claim 17, in which the moveable component comprises a cam.