CLAIMS

What is claimed is:

1. A dilution refrigerator comprising:

an outer vacuum chamber comprising an outer housing having at least one substantially planar surface; and

an opening in the at least one substantially planar surface of the outer housing configured to provide access to an experimental volume disposed within an interior of the outer vacuum chamber.

2. The dilution refrigerator of claim 1, further comprising a sample stage housed within the experimental volume, wherein the opening is configured to provide access to the sample stage through the outer vacuum chamber.

3. The dilution refrigerator of claim 2, further comprising one or more radiation shields housed within the outer vacuum chamber, and wherein portions of the one or more radiation shields proximate the sample stage are slidable and/or removable to provide access to the sample stage.

4. A dilution refrigerator comprising:

an outer vacuum chamber comprising an outer housing having at least one substantially planar surface; and

an opening in the at least one substantially planar surface of the outer housing configured to provide access to an experimental volume disposed within an interior of the outer vacuum chamber, wherein:

the at least one substantially planar surface of the outer housing comprises a first surface disposed within a plane perpendicular to a plane of a floor supporting the dilution refrigerator.

5. The dilution refrigerator of claim 1, wherein the at least one substantially planar surface comprises:

first surfaces disposed within a plane perpendicular to a plane of a floor supporting the dilution refrigerator; and

second surfaces disposed within a plane parallel to the plane of the floor, wherein the first surfaces and the second surfaces are arranged as a rectangular prism.

6. The dilution refrigerator of claim 1, wherein the opening comprises a hermetic opening.

7. The dilution refrigerator of claim 1, wherein the opening comprises a hinged door.

8. The dilution refrigerator of claim 7,

further comprising one or more radiation shields housed within the outer vacuum chamber, and wherein portions of the one or more radiation shields proximate the hinged door are slidable and/or removable to provide access to the interior of the outer vacuum chamber.

9. The dilution refrigerator of claim 7, wherein the opening further comprises a load lock.

10. The dilution refrigerator of claim 1, wherein the outer vacuum chamber comprises:

a first section; and

a second section suspended from the first section.

11. The dilution refrigerator of claim 10, wherein the first section is coupled to the second section by integrated clamps and/or cams.

12. The dilution refrigerator of claim 10, wherein the first and/or second section of the outer vacuum chamber are configured to be at least partially removed from the dilution refrigerator to provide access to an interior of the outer vacuum chamber.

13. The dilution refrigerator of claim 10, further comprising an external system configured to lift and/or lower the first and/or second section of the outer vacuum chamber.

14. The dilution refrigerator of claim 13, wherein the external system comprises pneumatic and/or hydraulic devices configured to lift and/or lower the first and/or second sections.

15. The dilution refrigerator of claim 13, wherein the external system comprises a screw mechanism configured to lift and/or lower the first and/or second sections.

16. The dilution refrigerator of claim 1, wherein the outer vacuum chamber is configured to fit within a server rack container.

17. The dilution refrigerator of claim 16, wherein the server rack container is configured to integrate with commercial server rack infrastructure.

18. The dilution refrigerator of claim 16, wherein the server rack container is a 19-inch server rack.

19. The dilution refrigerator of claim 17, wherein the server rack container comprises an external housing comprising an integrated horizontal surface.

20. The dilution refrigerator of claim 19, wherein the integrated horizontal surface is configured to be stowed when not in use.

21. The dilution refrigerator of claim 8, wherein:

the portions of the one or more radiation shields that are slidable and/or removable are coupled to the hinged door.

22. The dilution refrigerator of claim 1, wherein the at least one substantially planar surface comprises a plurality of substantially planar surfaces arranged such that the outer vacuum chamber has a first rectangular cross section in a plane parallel to a floor supporting the dilution refrigerator.

23. The dilution refrigerator of claim 22, wherein the opening is disposed in a portion of a first substantially planar surface of the plurality, the first substantially planar surface being disposed in a plane perpendicular to the floor.

24. The dilution refrigerator of claim 22, wherein the outer vacuum chamber has a second rectangular cross section in a plane perpendicular to the floor.

25. The dilution refrigerator of claim 10, wherein both the first section and the second section have rectangular cross sections in planes parallel to a floor supporting the dilution refrigerator.

26. The dilution refrigerator of claim 1, wherein the opening comprises at least one substantially right angle corner.