

**WHAT IS CLAIMED IS:**

1. A system, comprising:
  - a vacuum chamber;
  - a component, disposed in the vacuum chamber, that heats up during operation;
  - a cooling line, mechanically coupled to the component, to circulate coolant to cool the component during operation;
  - a vacuum gauge to measure a total pressure in the vacuum chamber; and
  - an analyzer to measure a partial pressure in the vacuum chamber of a substance that can leak from the cooling line.
2. The system of claim 1, wherein the cooling line comprises a coolant manifold in the vacuum chamber.
3. The system of claim 1, further comprising a chiller to chill the coolant in the cooling line, wherein:
  - the chiller is disposed outside of the vacuum chamber; and
  - the cooling line extends out of the vacuum chamber, through the chiller, and back into the vacuum chamber.
4. The system of claim 1, wherein:
  - the cooling line contains the coolant and further contains a marker species; and
  - the marker species is the substance that can leak from the cooling line.
5. The system of claim 4, wherein the coolant comprises ordinary water.
6. The system of claim 5, wherein the marker species is heavy water.
7. The system of claim 5, wherein the marker species corresponds to 1-propanol.
8. The system of claim 1, wherein:
  - the coolant comprises a fluorocarbon-based fluid that is absent from the vacuum chamber except in the event of a leak from the cooling line; and
  - the substance that can leak from the cooling line is the fluorocarbon-based fluid.

9. The system of claim 1, wherein:  
the component comprises a motor disposed within the vacuum chamber; and  
the motor comprises a motor coil to which the cooling line is mechanically connected, to cool the motor coil.
10. The system of claim 9, further comprising:  
a chuck to support a substrate; and  
a translatable stage, on which the chuck is mounted, to translate the chuck;  
wherein the motor is a stage motor to translate the stage.
11. The system of claim 10, wherein the vacuum chamber is a vacuum chamber in a scanning electron microscope (SEM).
12. The system of claim 10, further comprising extreme ultraviolet (EUV) optics disposed within the vacuum chamber.
13. The system of claim 10, further comprising electron optics disposed within the vacuum chamber, the electron optics comprising a magnetic lens.
14. The system of claim 1, wherein:  
the component comprises a magnetic lens; and  
the cooling line is mechanically connected to the magnetic lens, to cool the magnetic lens.
15. The system of claim 1, wherein:  
the component comprises a digital camera disposed within the vacuum chamber; and  
the cooling line is mechanically connected to the digital camera, to cool the digital camera.
16. The system of claim 1, wherein the analyzer comprises a mass spectrometer.
17. The system of claim 1, wherein the analyzer comprises an infrared spectrometer.
18. The system of claim 1, wherein the cooling line comprises flexible plastic.

19. A method, comprising:  
operating a component disposed in a vacuum chamber, wherein operating the component causes heating;  
circulating coolant through a cooling line mechanically coupled to the component, to cool the component;  
measuring a total pressure in the vacuum chamber;  
measuring a partial pressure in the vacuum chamber of a substance that can leak from the cooling line; and  
based on the partial pressure, determining whether the cooling line has a leak.
20. The method of claim 19, further comprising circulating a marker species along with the coolant in the cooling line;  
wherein measuring the partial pressure comprises measuring a partial pressure of the marker species in the vacuum chamber.
21. The method of claim 20, wherein the coolant comprises ordinary water.
22. The method of claim 21, wherein the marker species is heavy water.
23. The method of claim 21, wherein the marker species corresponds to 1-propanol.
24. The method of claim 19, wherein:  
circulating the coolant comprises circulating, in the cooling line, a fluorocarbon-based fluid that is absent from the vacuum chamber except in the event of a leak from the cooling line;  
and  
measuring the partial pressure comprises measuring a partial pressure of the fluorocarbon-based fluid in the vacuum chamber.
25. The method of claim 19, wherein operating the component comprises operating a motor disposed within the vacuum chamber, the cooling line being mechanically connected to a motor coil of the motor.
26. The method of claim 25, wherein operating the motor comprises translating a stage on which is mounted a chuck supporting a substrate.

27. The method of claim 19, wherein measuring the partial pressure comprises performing mass spectrometry.

28. The method of claim 19, wherein measuring the partial pressure comprises performing infrared spectroscopy.