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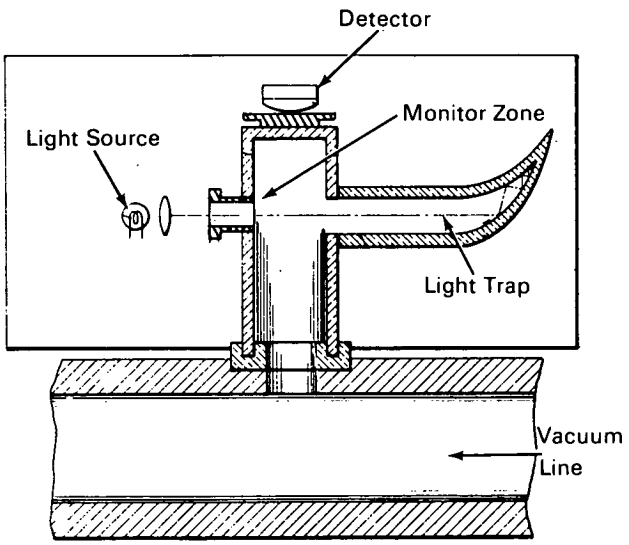
NASA TECH BRIEF

Vacuum Leak Detector Features Higher Sensitivity

A technique for measuring partial pressures has been developed which is potentially more sensitive than currently available methods. This method utilizes the extremely large resonance scattering cross section of xenon at 1471 Å to scatter light in a vacuum cell.



The figure illustrates the leak detector configuration. A tube with a sapphire window transparent at 1471 Å, and about 1 cm in diameter and 15 cm in length, is connected to a feedthrough in a sidearm of the evacuation line of the vacuum system under test. A beam of light from a xenon lamp is passed through the tube and is absorbed by a light trap as shown. An ultraviolet-sensitive photodetector detects light scattered by the residual gas in the vacuum system. If the output signal of the detector is proportional to the light intensity, it will also be proportional to the partial pressure and consequently to the rate of inleakage of xenon probe gas. Periodic calibration, if desired, can be performed with a calibrated pin-hole leak.

Notes:

1. The partial-pressure detection limit for xenon was determined to be 2×10^{-13} torr.
2. The following documentation may be obtained from:

   Clearinghouse for Federal Scientific and Technical Information
   Springfield, Virginia 22151
   Single document price $3.00
   (or microfiche $0.65)

   Reference:
   NASA-CR-86243 (N69-38379), Techniques Applicable to Mass Spectrometry of Gaseous Trace Contaminants

Patent status:

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