

## Material Detection by Phase Shift Cavity Ring-Down Spectroscopy

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**Abstract :** Traditional optical methods for example resonance wavelength shift and cavity ring-down spectroscopy used for material detection and sensing have disadvantages, for example, less resistance to laser noise, temperature fluctuations and extraction of the required information can be a difficult task like ring downtime in case of cavity ring-down spectroscopy. Phase shift cavity ring down spectroscopy is not only easy to use but is also capable of overcoming the said problems. This technique compares the phase difference between the signal coming out of the cavity with the reference signal. Detection of any material is made by the phase difference between them. By using this technique, air, water, and isopropyl alcohol can be recognized easily. This Methodology has far-reaching applications and can be used in air pollution detection, human breath analysis and many more.

**Keywords :** materials, noise, phase shift, resonance wavelength, sensitivity, time domain approach

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