

Precision Broadband Wavemeter for Millimeter and Submillimeter Range (Short Papers)

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A precise, broadband, Fabry-Perot wavemeter has been designed and built to measure wavelengths in the millimeter and submillimeter range. The design of the wavemeter is novel in that it enhances the fundamental mode over a wide band and permits determination of the exact longitudinal index of the mode. With the use of an exact mode number in wavelength calculations, high measurement accuracies, to the extent permissible by the quality factor of the resonator, can be obtained. The wavemeter was tested by measuring well-known spectral lines of the OCS molecule in the frequency range of 72-607 GHz. Measurement of 24 OCS lines demonstrated an accuracy of better than 2×10^{-5} in relative units and 0.87×10^{-5} in rms units for frequency/wavelength. A discussion of further development and automation of the wavemeter is included.

 [Return to main document.](#)