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Title:Upgrading the sensitivity of spectroscopy gas analysis with application of supersonic molecular beams

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Abstract:We propose an approach to increase a sensitivity of microwave and THz spectroscopy, that involves application of supersonic molecular beams. The key advantage offered by such an approach is that a gas temperature can be decreased along with an increase in the gas density, which results in a much greater number of molecules interacting with radiation and, hence, in a higher absorption coefficient. This effect has been demonstrated experimentally on supersonic CO and NO beams, using a phase manipulation microwave spectrometer. The absorption coefficient was found to be three orders of magnitude higher than the value of gas absorption coefficient in a standard 1-m long cell at room temperature.

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Uncontrolled terms:spectroscopy gas analysis sensitivity - supersonic molecular beams - microwave spectroscopy - terahertz spectroscopy - gas temperature - gas density - phase manipulation microwave spectrometer - gas absorption coefficient

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