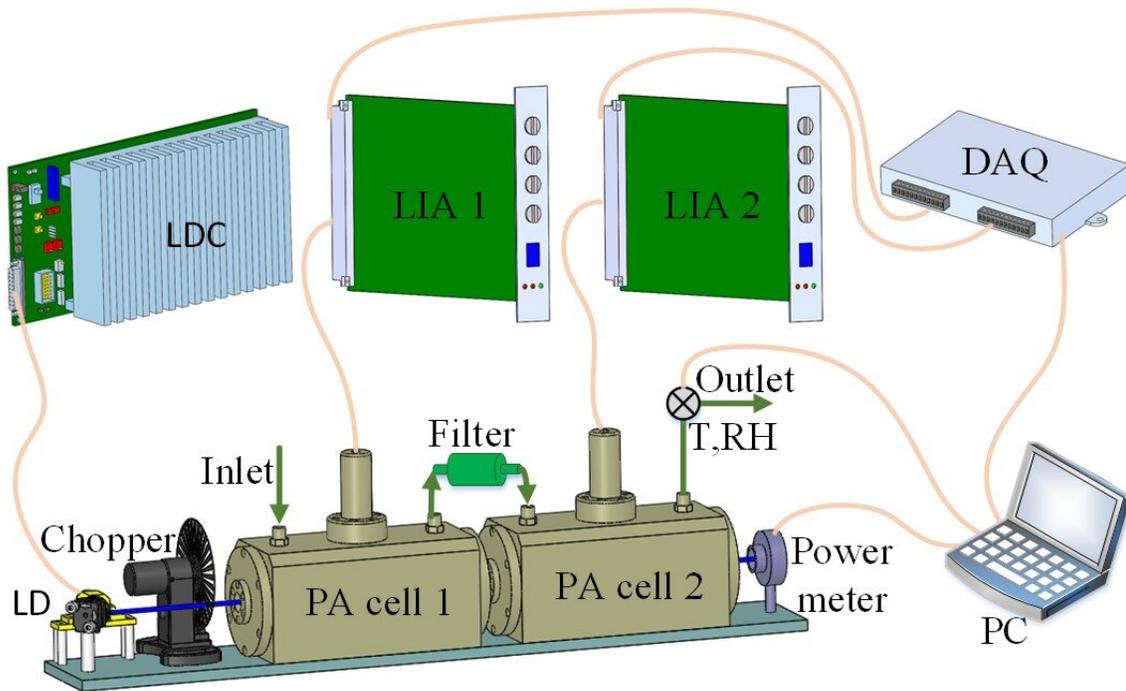


Novel sensor to measure atmospheric aerosols and nitrogen dioxide simultaneously

January 6 2021, by Zhang Nannan



Experimental setup of the D-PAS. Credit: LIU Kun

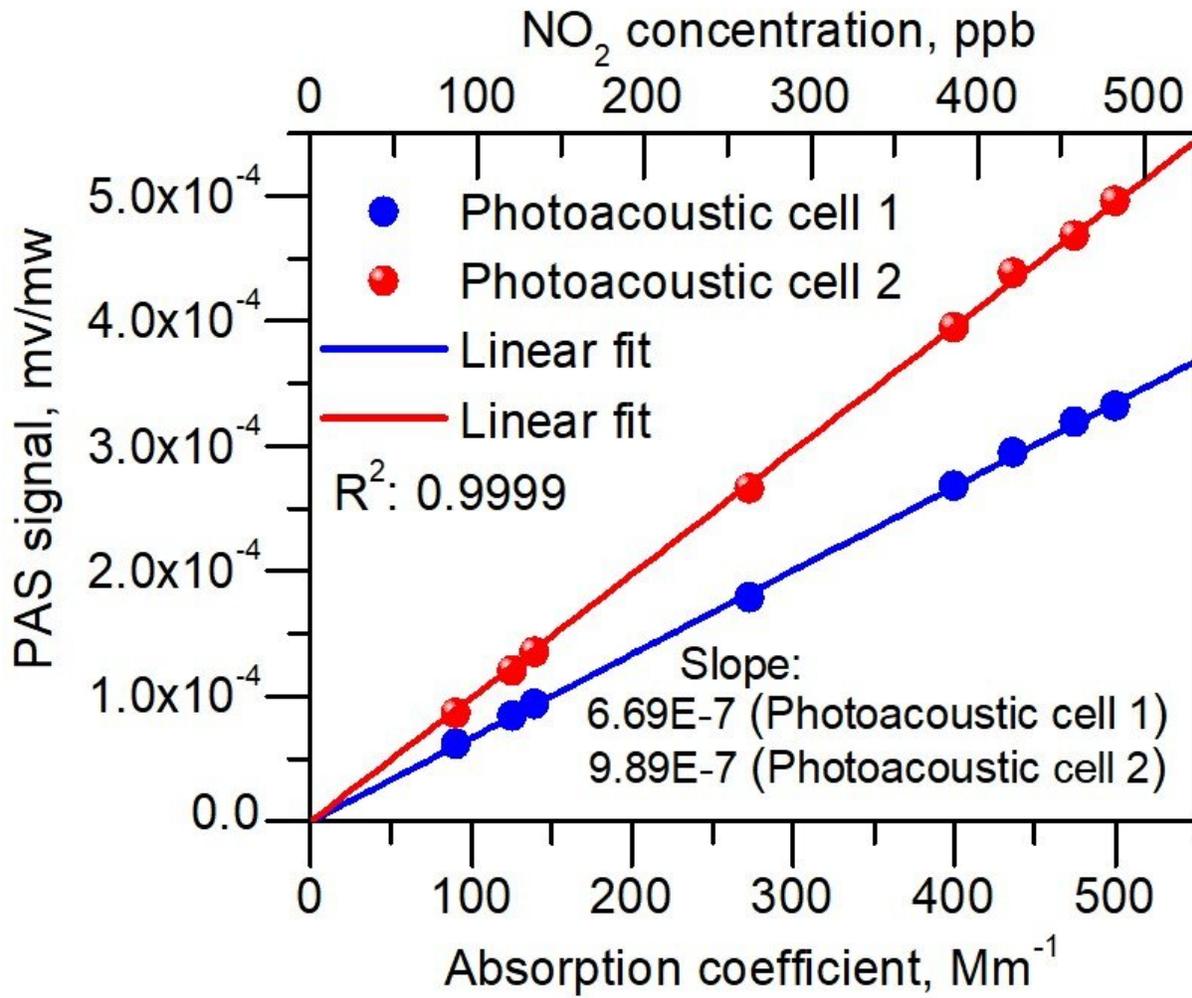
Recently, Prof. Gao Xiaoming's group from the Anhui Institute of Optics and Fine Mechanics (AIOFM) of the Hefei Institutes of Physical Science (HFIPS) designed and manufactured a photoacoustic spectroscopy-based sensor to measure aerosols and nitrogen dioxide (NO₂) simultaneously.

Atmospheric aerosols and NO_2 are considered main pollutants in the air, while the online measurement of aerosol absorption characteristics still poses many challenges. Since the photoacoustic spectroscopy (PAS) is not affected by [light scattering](#) and the acoustic transducer is not limited by the wavelength of light, it has unique advantages in the measurement of aerosols and trace gases.

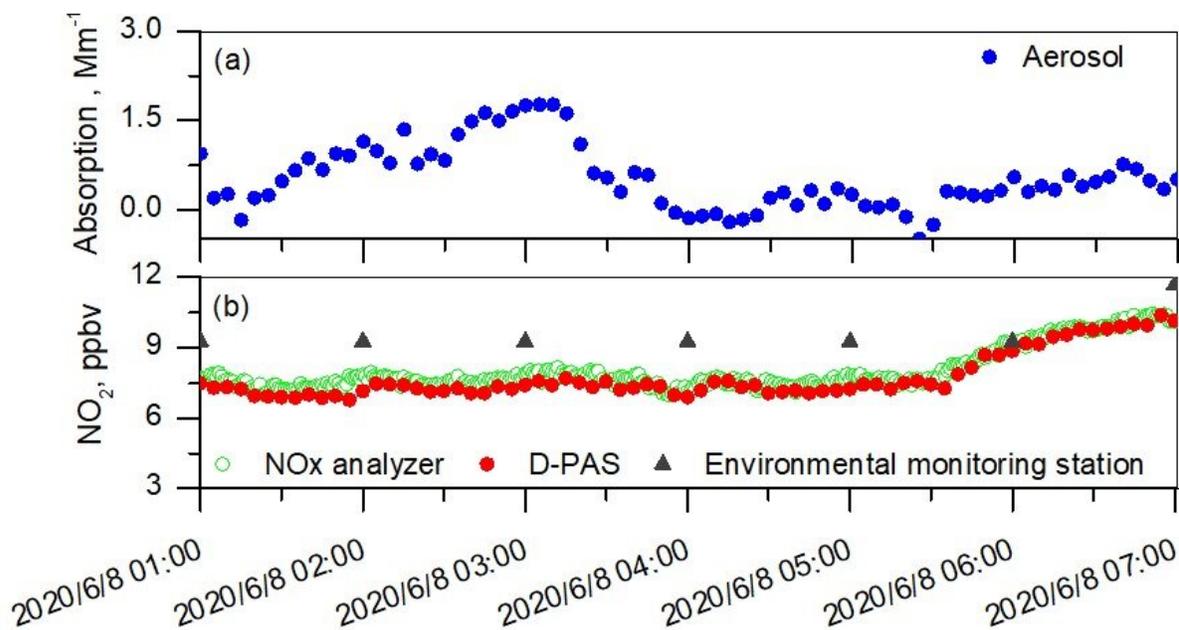
"This PAS (D-PAS) is based on a 443 nm laser diode," explained Prof. LIU Kun, member of the research team. "By optimizing the structure of acoustic resonator, we realized [high sensitivity](#) and large flow rate for online measurement of aerosol absorption and NO_2 ."

During the experiment, both the intercomparison and consistency between the developed D-PAS and commercial NOX analyzer when measuring NO_2 in the atmosphere proved the reliability of this novel D-PAS sensor.

With important potential applications in the development of [aerosol](#) absorption and NO_2 analysis, this sensor can be applied to the field of atmospheric measurement or environmental monitoring.



Calibration results of the developed D-PAS. Credit: LIU Kun



Time series measurements of aerosol absorption coefficient and NO_2 concentration. Credit: LIU Kun

More information: Yuan Cao et al. Development of a 443 nm diode laser-based differential photoacoustic spectrometer for simultaneous measurements of aerosol absorption and NO_2 , *Photoacoustics* (2020). [DOI: 10.1016/j.pacs.2020.100229](https://doi.org/10.1016/j.pacs.2020.100229)

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