

Interactive comment on “A cavity ring down/cavity enhanced absorption device for measurement of ambient NO₃ and N₂O₅” by G. Schuster et al.

G. Schuster et al.

Received and published: 7 November 2008

We thank V. Kasyutich for his interest and comments. Our replies are below:

Comment It is unclear from your description of an optical set-up how an off-axis alignment is arranged. Moreover, your conclusions on necessity of an optical isolator give some doubts that it is truly off-axis alignment as 2nd reviewer has already pointed out. Typically, there is no need for any optical isolator in off-axis CEAS. However, when there are excitations of TEM₁₁, TEM₂₂ and some high order TEM cavity modes (on-axis alignment) than an optical isolation between a laser and a cavity is necessary. It would be much clear for a reader if you would report what an approximate dimension of output light spot was observed on a cavity output mirror in a way as, for example, it was described in Ayers, J. D. et al publication.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Reply The use of the optical isolator is a precautionary measure. As a first step in setting up the cavity alignment (e.g. after cleaning mirrors etc) we align on-axis, hence the necessity for either a small iris or an optical isolator. In off axis operation this is not needed. In early attempts to set up for CEAS, we checked the cavity output by eye, but it was only observable through a lens, making estimation of its size difficult. Its shape did however vary between several semi-stable configurations typical of off axis alignment ranging from pin-cushion to doughnut.

Comment It is still unclear about origin of discrepancy between CRD and CEAS concentrations. Are these errors due to amplified spontaneous emission coming through the interference filter (in this case the equation (2) should include an amplified spontaneous emission intensity) or due to PMT output drift. Could you report on bandwidths of 662 nm interference filter and high reflectivity mirrors?

Reply The most likely cause for the small difference is not spontaneous emission as the interference filter (half-width = 10 nm) should eliminate this. We state that "varying electrical offsets (caused e.g. by changing temperature of the PMT or other data acquisition electronics) may result in falsification of the CEAS data analysis if the zero signal (i.e. when the laser light is blocked) is not measured occasionally. This would appear to be the most likely explanation for the differences in CEAS and CRD sometimes observed in our datasets." We shall mention the bandwidth of the filter in a revised manuscript. The wavelength range over which the high reflectivity mirror have maximum reflectivity is 10-15 nm.

Comment The same letter "I" was used for light intensity (page 74, line 13), optical path length (p.74, line 18) and length of glass T-piece (page 75, line 11).

Reply This is partially a font problem. The big i (light intensity) and the small I (path-length) are very similar. This will be resolved in the revised manuscript.

Interactive comment on Atmos. Meas. Tech. Discuss., 1, 67, 2008.