

## Direct determination of surface aerosol extinction coefficient using a Cavity Ring-Down apparatus in a continuous 665-675 nm band

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**Abstract:** A high-finesse Cavity Ring-Down (CRD) apparatus [1, 2] is proposed to determine in situ the aerosol extinction coefficient for a continuous visible range of 665 - 675 nm. This spectral window was select intentionally to avoid strong absorption by water vapor[3]. According to the specified reflectivity of mirrors, a meter-size cavity can produce an optical path around 30 km. A fiber-based supercontinuum light source illuminates one end of the cavity and an iCCD camera coupled to a Czerny-Turner spectrometer records the transient signals. Primarily, is performed a reference measurement in vacuum where the decays are related to the mirror and cavity losses. The subsequent measurement is performed by sampling ambient air containing aerosol particles that produce shorter decays due to additional losses by absorption or scattering of light. The corresponding wavelength dependent extinction coefficient is proportional to the difference between the reference and the filled cavity measurements. Preliminary results shown values of extinction coefficients ranging from 4.9 E-8 to 6.4 E-8 cm-1. The Rayleigh scattering theory yields a similar value of 5.3 E-8 cm-1 and the small discrepancy is probably caused by Mie scattering on residual dust particles.

### References

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• **Keywords:** Cavity Ring-Down Spectroscopy; Extinction Coefficient; Aerosol Optical Properties.