

Laser-Induced Plasmas in Ambient Air for Incoherent Broadband Cavity-Enhanced Absorption Spectroscopy

Albert A. Ruth¹, Sophie Dixneuf¹, Johannes Orphal²

¹*Department of Physics & Environmental Research Institute, University College Cork, Cork, Ireland*

²*Karlsruhe Institute of Technology, Institute for Meteorology & Climate Research, D-76344 Eggenstein-Leopoldshafen, Germany*

The emission from a laser-induced plasma in ambient air, generated by a high power femtosecond laser, was utilized as pulsed incoherent broadband light source in the center of a quasi-confocal high finesse cavity. The time-dependent spectra of the light leaking from the cavity was compared with those of the laser-induced plasma emission without the cavity^[1]. It was found that the light emission was sustained by the cavity despite the initially large optical losses of the laser-induced plasma in the cavity. The light sustained by the cavity was used to measure part of the S1 \leftarrow S0 absorption spectrum of gaseous azulene at its vapour pressure at room temperature in ambient air as well as the strongly forbidden gamma-band in molecular oxygen at 628 nm.

References

[1] A.A. Ruth, S. Dixneuf, J. Orphal, "Laser-induced plasmas in ambient air for incoherent broadband cavity-enhanced absorption spectroscopy", *Opt. Express* 23 (2015) 6092-6101.