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Spatially Resolved Ozone Density in Volumetric and Surface Dielectric Barrier Discharges via Absorption Spectroscopy[1] RYAN T. SMITH, BJRN OFFERHAUS, FRIEDERIKE KOGELHEIDE, NIKITA BIBINOV, PETER AWAKOWICZ, Allgemeine Elektro- und Plasmatechnik Ruhr-Universitt Bochum, KATHARINA STAPELMANN[2], Nuclear Engineering - North Carolina State University — Absorption spectroscopy is performed on two different Dielectric Barrier Discharges, a Surface (SDBD) and a Volumetric (VDBD), in order to measure the Ozone (O_3) density within the gas phase. A Laser Driven Light Source (LDLS) is used as a very stable, high intensity broad-band source between 170 nm and 2400 nm. The light emitted from the collimated LDLS and the plasma are shown through a narrow band filter at 253.7 $\pm$ 5 nm to isolate the O_3 Hartley band centered about 253.65 nm. Absorption measurements are performed on both the SDBD and VDBD at atmospheric pressure under varying gas mixtures and at flows of 10 slm and 2 slm, respectively. Spatial resolution is achieved on the order of 0.1 mm with a CCD camera. Furthermore, measurements are taken at multiple frequencies and peak to peak voltages resulting in varying power densities. A direct comparison of the gas phase O_3 is made at the same operating frequency and power density of the two plasma sources.

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