

**Abstract**—The influence of stimulated Raman scattering on the characterization of aqueous aerosols by linear Raman spectroscopy was studied experimentally. Raman scattering from a chain of microdroplets was excited by an argon ion laser. Holographic Raman filters, a spectrograph and a cryogenically cooled CCD detector were used to record the spectra. A procedure to estimate the detection limits of Raman instrumentation is presented. For the set-up used here, the detection limit for nitrogen in a gas mixture was 3 ppm. The detection limit for aqueous aerosol particles was limited to  $100 \text{ mg m}^{-3}$  by the occurrence of stimulated Raman scattering (SRS). The first measurement of SRS with continuous-wave excitation in water droplets is reported. The SRS thresholds for water droplets in the size range of 15–75  $\mu\text{m}$  were 0.3 to 1  $\text{MW cm}^{-2}$ . For droplets, which consist of a 5 M  $\text{NaNO}_3$  solution, the threshold was 0.2  $\text{MW cm}^{-2}$ . Continuous-wave excited four-wave mixing in microdroplets of  $\text{NaNO}_3$  solution is reported. © 1998 Elsevier Science Ltd. All rights reserved