



## **Supercontinuum lidar for hydrometeors and aerosols optical properties determination**

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Lidar remote sensing of hydrometeor and atmospheric aerosols has become recently an important field of investigation for both academic research (e.g. climate, atmospheric physics and chemistry) and industrial or public applications (e.g. air quality, pollution monitoring). Various retrieval methodologies have been developed up to know to identify the microphysical properties of these atmospheric constituents, but a much better characterization would benefit from broadband sources extending over an as large as possible spectrum. Indeed, currently, lidar measurements use a few discrete wavelengths in the visible or the near infrared which can be a severe limitation in the determination of the microphysical properties of the atmospheric constituents without any a priori or extra knowledge (e.g. nature, shape or complex index of aerosols).

Supercontinuum laser sources that extend from the visible to the infrared offer new possibilities for measuring optical properties of hydrometeors and atmospheric aerosols over a wide continuous spectral range. We present herein some illustrations of these possibilities by means of hydrometeor broadband extinction measurements in a cloud chamber. A homemade supercontinuum lidar numerical tool called PERFALIS (PERFORMANCE Assertion for Lidar Systems) is then presented. Because this lidar simulator is devised to remote sensing, we also show that the equivalent-sphere models are strongly limited when looking for optical properties of complex-shaped atmospheric constituent (e.g. ice crystal, soot aggregates) over the spectral range ranging from the visible-to-the infrared (400-5000 nm).