

## **Technical introduction of LIFE (Laser Induced Fluorescence Explorer) : A high-power, multi-spectral and flexible lidar developed in the framework of AGORA-Lab**

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Many techniques have been developed to retrieve aerosols properties using atmospheric LIDARs. Aerosols fluorescence has been studied for the past 10 years, and is a challenge for better classifying aerosols, compared to standard Mie-Raman backscattering LIDARs. Fluorescence study has been performed in Lille since 2018 using LILAS (Lille LIDAR Atmospheric Study) instrument. However, these measurements require the use of a high-power laser source to retrieve aerosol properties more precisely. In this framework, a new LIDAR, named LIFE (Laser Induced Fluorescence Explorer) is being developed by the LOA in collaboration with CIMEL company. This LIDAR aims at being more powerful and more flexible than the existing instrument, enabling up to 15 detection channels per configuration. LIFE laser source will emit at 3 wavelengths (355, 532 and 1064 nm), and will be 5 times more powerful than LILAS, which will enable to derive more precise aerosol properties, allow aerosol typing and probe higher in the atmosphere. LIFE emission module will also allow to emit only 355 nm and block the contribution of 532 nm and 1064 nm in order to prevent the pollution of the visible wavelengths to the fluorescence signal. LIFE will finally benefit from 6 configurations in reception, including one with 5 fluorescence channels, allowing acquisition from 400 nm to 650 nm.

**Keywords:** LIDAR, instrumental development, aerosols typing, fluorescence, scattering,

### **References**