Plenary Talk PV IX Thu 9:00 RW 1

Controlling atmospheric processes with high intensity lasers

— •Jean-Pierre Wolf — Applied Physics, University of Geneva, Switzerland

Filamentation of multi TW-class lasers (1TW = 1e12 W) opened new perspectives in atmospheric research. Laser filaments are self-sustained light structures of typically 100 um diameter and up to hundreds of meters in length, widely extending the traditional linear diffraction limit. They stem from the dynamic balance between Kerr self-focusing and defocusing by the self-generated plasma and/or negative higher-order Kerr terms. While propagating non-linearly in air, laser filaments generate a coherent supercontinuum (from 230 nm to 4 um) by self-phase modulation (SPM), which has proven as an ideal source for Lidar remote sensing of air pollutants. But laser filaments are not only able to observe atmospheric processes, they are able to control atmospheric processes. Four spectacular examples will be highlighted in the present presentation: (1) lightning control, (2) laser induced water vapour condensation, (3) transmission of optical data through fogs and clouds, and (4) modulation of the radiative forcing properties of cirrus clouds.