Andre Mysyrowicz, J Laser Opt Photonics 2018, Volume 5
DOI: 10.4172/2469-410X-C1-019

Andre Mysyrowicz

ENSTA-Ecole Polytechnique, France

Filamentation in air and applications

The fate of an ultra-short laser pulse propagating in air depends crucially upon its initial peak power. Below a critical value Pcr, group velocity dispersion and beam diffraction combine to rapidly reduce the pulse intensity. On the other hand, if P>Pcr a completely different behavior is observed. In this case the pulse intensity increases with distance up to the point where it becomes sufficiently high ($\approx 10^{14}$ W/cm^2) to ionize air. The pulse then retains this high intensity for very long distances, which can reach km. This regime is called filamentation. In this talk the basic notions at the heart of filamentation will be introduced. Techniques to characterize filaments will be described. This includes measurements of the beam size, pulse intensity and duration, length of the plasma column created in the wake of the pulse and the plasma density evolution. Results of numerical simulations reproducing the filamentary regime will be shown. A second part will be devoted to applications of filaments. They include the remote sensing of atmosphere, the triggering of long-lived electric discharges and the contactless transfer of high electric power and more recently the realization of cavity-free lasing in air.

Biography

Andre Mysyrowicz is a recognized world leader in the field of filamentation, with more than 150 publications. He has wide experience in conducting field experiments, in the development of diagnostics and in the interpretation of data. He was one of the Cofounders and Leaders of Teramobile, a joint French-German project for the development and use of the first mobile terawatt laser system.

andre.mysyrowicz@ensta.fr