

Towards a compact high repetition rate fs-CARS thermometry instrument

M. Scherman¹, A. Bresson¹, B. Tretout¹
¹ONERA, Palaiseau, France

In order to probe the fast temporal dynamics of turbulence in reactive media, optical measurement of thermodynamical parameters are required at high repetition rate (kHz).

Hybrid femto-picosecond regimes has been successfully tested in laboratory flames in order to probe the spectral [1,2] and temporal [3] molecular response and retrieve temperature information at high repetition rate. However, using the measurement set-up into real combustion facilities is still a challenge.

An original laser architecture that aims to be transportable and robust is proposed. An unique industrial pump laser is used, which is composed of a Yb:KGW fiber oscillator, and a regenerative amplifier in a compact design (Pharos, LightConversion).

Hybrid femto-picosecond CARS scheme has been chosen for its spectral resolution capabilities, and vibrational CARS will be adopted to probe high temperature regime.

The high compactness of the modulus allows integrating the whole laser beam generation lines into a single mobile platform as illustrated in Fig. 1. It is designed to be brought as close as possible to real combustion facilities and run in a non controlled environment.

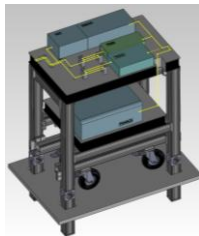


Figure 1. Integration of the laser system in a mobile design

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