

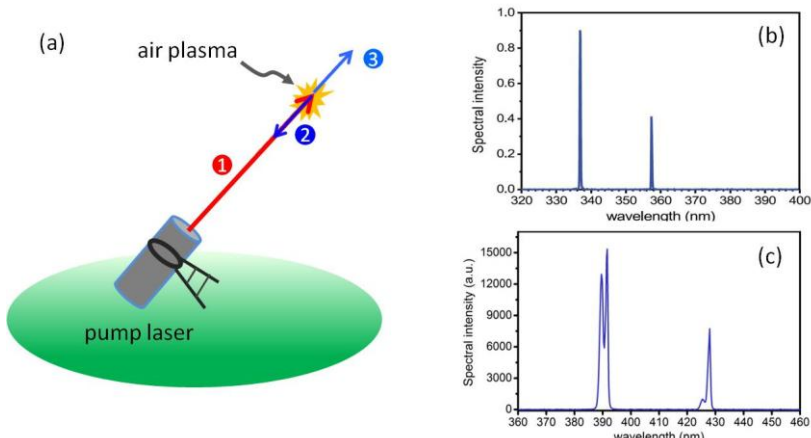
Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars)

Proposition de stage

Date de la proposition : 30/10/2013

Responsable du stage / internship supervisor:	
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Lieu du stage / internship place: LOA	

Titre du stage / internship title: Lasing effect in air
<p>In 2011, lasing of air emerged as a new phenomenon during laser-material interaction [1]. Air lasing has attracted tremendous research enthusiasm in recent 3 years due to its potential applications for remote sensing, through stimulated and nonlinear backward scattering processes[2-3]. These nonlinear optical detection methods are expected to bypass unprecedentedly the traditional remote sensing techniques due to the coherent nature of detection and the high directionality of the optical signal. At present, there are still many important fundamental questions concerning the mechanism of air lasing and its applications are still in infancy.</p>

<p>Figure 1. (a) Artistic view of lasing of air. The backward lasing radiation (pulse 2) and the forward lasing emission (pulse 3) are produced in the air plasma generated by the pump laser (pulse 1). (b) Backward lasing spectrum in Ref. 2. (c) Measured forward lasing spectrum in our laboratory.</p>
<p>In this stage, you are expected to participate several conceived experiments concerning the backward and forward lasing action in air. The experiment will be performed at the Laboratoire d'Optique Appliquée with the femtosecond laser facilities of the ILM group. The aim is to extend our understanding of the physics mechanism underlying the air lasing both experimentally and theoretically, explore the optimal working conditions of the air lasing and search for its improvement.</p>
<p>Ref:</p> <p>[1] A. Dogariu, J. B. Michael, M. O. Scully, and R. B. Miles, "High-gain backward lasing in air," <i>Science</i> 331, 442 (2011). [2] D. Kartashov, <i>et al</i>, "Free-space nitrogen gas laser driven by a femtosecond filament," <i>Phys. Rev. A</i> 86, 033831 (2012). [3] Y. Liu, <i>et al</i>, "Self-seeded lasing in ionized air pumped by 800 nm femtosecond laser pulses," <i>Opt. Express</i> 21, 22791 (2013).</p>

Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : Oui			
Si oui, financement de thèse envisagé/ financial support for the PhD: Allocation ministérielle (EDX), bourse Monge, AMN ou bourse DGA en fonction du candidat.			
Lasers, Optique, Matière	X	Lumière, Matière : Mesures Extrêmes	X
Plasmas : de l'espace au laboratoire			

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