

Lasing in the sky

Friday, 16 October 2015 08:50 (20 minutes)

A short and intense IR femtosecond laser pulse launched in atmosphere undergoes filamentation, with the emergence of a long thin plasma column in the wake of the laser pulse. We will show that this plasma column acts as an efficient optical amplifier in the UV and can form a cavity-less laser. The origin of this optical gain will be discussed. Depending on the polarization of the femtosecond laser pulse (circular or linear), stimulated emission stems from an inversion of population either between excited and ground triplet states of the neutral nitrogen molecule or between excited and ground states of the singly ionized nitrogen molecule. The mechanism responsible for population inversion in both cases will be discussed.

Summary

A short and intense IR femtosecond laser pulse launched in atmosphere undergoes filamentation, with the emergence of a long thin plasma column in the wake of the laser pulse. We will show that this plasma column acts as an efficient optical amplifier in the UV and can form a cavity-less laser.

Primary author: Prof. MYSYROWICZ, Andre (LOA ENSTA école polytechnique Palaiseau)

Co-authors: Dr HOUARD, Aurélien (LOA ENSTA); Dr LIU, Yi (LOA ENSTA)

Presenter: Prof. MYSYROWICZ, Andre (LOA ENSTA école polytechnique Palaiseau)

Session Classification: Bridging High Energy Physics and Space technology (NEXT)

Track Classification: Presentations