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Contribution ID: **3793** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Passively Q-Switched fiber laser using an aqueous solution of gold nanorods and poly vinyl alcohol as a saturable absorber

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Authors demonstrated a passively Q-Switched pulse laser by using an aqueous solution of colloidal gold nanorods (GNRs) and Poly vinyl Alcohol (PVA) as a Saturable Absorber (SA) in a fiber ring laser cavity. GNRs, due to its unique plasmonic and nonlinear properties, has the potential to generate ultrashort pulses. In addition, a tunable laser can be developed using a mixture of GNRs with different lengths (aspect ratios = length/diameter). However, the application of GNRs is limited in developing high-power lasers due to their low damage threshold. The aqueous solution used in the experiment increased the damage threshold of the GNRs, and their shape remained intact after prolonged exposure to high power. The heat accumulated in the GNRs can dissipate in the surrounding medium in less time than the time required to deform the shape of GNRs responsible for the plasmonic properties. PVA provided stability to the solution and restricted the accumulation of GNRs in the solution, resulting in uniform distribution of GNRs, which was examined in TEM images. The density of GNRs was increased in the aqueous solution to increase light absorption. Q-Switched pulses were generated having a width, repetition rate and average power of 9.2 μs, 21.5 kHz, and 3.25 mW, respectively, at 1560 nm central wavelength. The authors will present the design of the laser cavity, the process of preparing SA and Experimental results, which include TEM images showing the distribution of GNRs in PVA at different concentrations.

Keyword-1

Q-Switched pulse laser

Keyword-2

Saturable Avsorber

Keyword-3

Gold nanorods

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