The all-fiber cladding-pumped Yb-doped gain-switched laser - DTU Orbit (01/04/2019)

The all-fiber cladding-pumped Yb-doped gain-switched laser

Gain-switching is an alternative pulsing technique of fiber lasers, which is power scalable and has a low complexity. From a linear stability analysis of rate equations the relaxation oscillation period is derived and from it, the pulse duration is defined. Good agreement between the measured pulse duration and the theoretical prediction is found over a wide range of parameters. In particular we investigate the influence of an often present length of passive fiber in the cavity and show that it introduces a finite minimum in the achievable pulse duration. This minimum pulse duration is shown to occur at longer active fibers length with increased passive length of fiber in the cavity. The peak power is observed to depend linearly on the absorbed pump power and be independent of the passive fiber length. Given these conclusions, the pulse energy, duration, and peak power can be estimated with good precision.

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