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Fiber laser is both Q-switched and modelocked

Modelocked lasers produce ultrashort pulses at high frequencies, but generally with low pulse energies (or with ultralong cavity lengths to increase pulse energy). Q-switched lasers typically have lower repetition rates, but higher energies and wider pulses. Although combining both effects produces high-energy, higher-repetition-rate, shorter pulses, this doubly active performance had not been demonstrated for a fiber laser—until now. Researchers at Universidad de Valencia are the first to demonstrate a Q-switched, modelocked (QML) fiber laser; their device even uses all-fiber in-line components.

For the QML fiber laser, Q-switching is achieved by using a magnetostrictive device to modulate the output from a [fiber Bragg grating](#) (FBG) at the output of the fiber laser, in turn modulating the Q factor of the Fabry-Perot cavity. Modelocking is achieved by using a second FBG at the input of the fiber laser in an acousto-optic modulator configuration. For a Q-switched repetition rate of 500 Hz and a pump power of 100 mW, the QML laser (with an emission wavelength of 1530.55 nm) generates trains of 12 to 14 modelocked pulses with a pulse duration of about 1 ns each within an envelope of 550 ns. The envelope energy is about 0.65 μ J, with a peak power higher than 250 W for the central pulses of the train. *Contact Christian Cuadrado-Laborde at Christian.Cuadrado@uv.es.*




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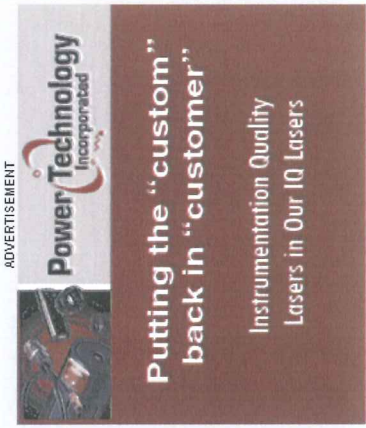
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