

# GIGAJET TWIN

dual femtosecond oscillator



## highspeed femtosecond oscillators

GIGAOPTICS designs and manufactures femtosecond laser oscillators that operate at uniquely high repetition rates of up to 3 GHz and offer a remarkable versatility and compactness. Since 1999, their robust design allows them to serve as a reliable tool in a variety of scientific and industrial applications. We offer expertise in femtosecond technology. Visit us at [www.gigaoptics.com](http://www.gigaoptics.com).

## the TWIN version of models GIGAJET 20/20C/30S

GIGAOPTICS' laser oscillators GIGAJET 20/20C/30S are now available as TWIN version. Any two of the three models are combined on one temperature-stabilizable semi-monolithic platform to form a TWIN VERSION. The repetition rate of a single laser is long-term stable to within 500 Hz. Residual repetition rate fluctuations of both lasers are highly synchronous. Thus, if required, active stabilization of the lasers at equal repetition rates or at a fixed detuning is straightforward and easy. This allows for an extraordinarily compact realization of spectroscopy techniques that use two femtosecond lasers with Gigahertz repetition rates.

The semi-monolithic TWIN housing (see Fig. 1) accommodates two GIGAJET laser oscillators on an extremely small footprint of only 31cm × 36cm at a height of 9cm. The lasers are adjusted and operated with external controls.

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## Applications of the GIGAJET TWIN laser oscillators

The TWIN version of the GIGAJET laser oscillators is used for applications where two femtosecond lasers with a high absolute and relative stability are required. The two lasers can be stabilized to have equal repetition rates or to have a fixed repetition rate detuning anywhere between a few Hertz and several Meahertz.

Aside from applications at equal repetition rates, e.g. two-color pump-probe spectroscopy, novel spectroscopy techniques where the repetition rates are chosen to have a fixed detuning are especially interesting. Such applications which can be realized very efficiently with Gigahertz repetition rates are high-speed asynchronous optical sampling ([C. Janke et al., Opt. Lett. **30**, 1405 (2005)], also see [www.gigaoptics.com](http://www.gigaoptics.com) for a detailed application note) or time-domain FTIR spectroscopy [F. Keilmann et al., Opt. Lett. **29**, 1542 (2004)].

High-speed ASOPS is a novel technique that utilizes a GIGAJET 20/20C/30S TWIN version for time-domain and THz spectroscopy without moving mechanical parts. High-speed ASOPS allows for rapid temporal delay scanning over windows as long as 1 ns and has the capability for much higher data acquisition rates than what is feasible with conventional delay scanning techniques.

Initial installation and training in customer's application lab are provided. Protected by U.S. patent 6,618,423 and European patents.

## technical specifications

(example specifications for a dual GIGAJET 20C on a TWIN platform, subject to changes without notice)

repetition rate	1 GHz ( $\pm 10$ MHz)
pulse length	$\leq 50$ fs <sup>*1</sup>
output power	650 mW <sup>*2</sup>
tuning range	750 nm – 850 nm <sup>*3</sup>
beam quality	$M^2 \leq 1.2$ (sag. plane) $\leq 1.6$ (tang. plane)
dimensions	310×360×90 mm <sup>3</sup>

<sup>\*1</sup> after appropriate extracavity compression

<sup>\*2</sup> @ 5.5 W pump power in a TEM<sub>00</sub> mode pump beam of 532 nm wavelength (equivalent to a Coherent Verdi™)

<sup>\*3</sup> minimal guaranteed tuning range, typical 730 nm – 870 nm

operating temp.	21°C $\pm$ 5°C
power requirements	no electrical power required
cooling water req.	flow 0.5 – 1.5 l/min. temp. $\sim$ 20°C, stable to $\pm$ 0.1°C

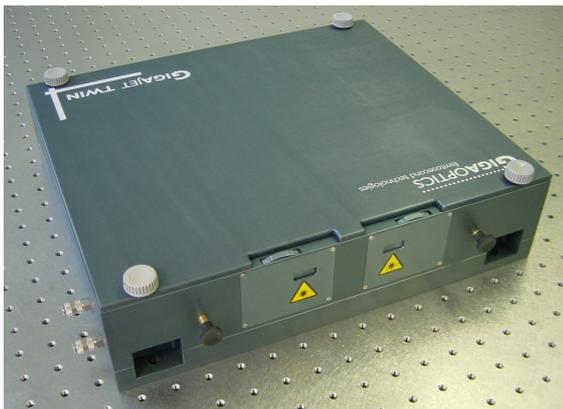


Fig. 1: Photo of Gigajet TWIN.