Swept wavelength tunable lasers and booster optical amplifiers

Tunable external cavity lasers (TECL series) and tunable ring cavity lasers (TRCL series) are small-sized tunable lasers, based on semiconductor optical amplifiers (SOA). A narrow-band acousto-optical tunable filter (AOTF) is used for both series as a spectrally selective element. AOTF is a temperature stabilized element, with no moving parts, what ensures excellent stability and repeatability of the set wavelength and the tuning range in time. The emission linewidth does not exceed 0.05 nm (FWHM) and the output optical power is 3 mW over the entire tuning range for both devices.

Tuning range and sweep speed are user-adjustable parameters in our lasers. The lasers can operate in single sweep and continuous sweep modes, or emit light at a user-configurable wavelength.

TECL series laser

TRCL series laser

BST series booster unit

Laser output power can be further increased by using the booster optical amplifier units (BST series) based on semiconductor optical amplifiers (SOA). Depending on the spectral range at which the seed laser operates, power boosting up to 20 – 50 mW, and for certain models even up to 100 mW is possible.

Swept wavelength tunable lasers and booster optical amplifiers at 770 – 825 nm, 805 – 880 nm, 880 – 995 nm, and 1020 – 1090 nm spectral ranges are available.

Features

- high stability and repeatability of the wavelength;
- no mechanically moving components in the optical design;
- tuning range up to 75 nm (user-adjustable);
- linear k(t) sweep;
- output power of 3 mW;
- optical power boosting up to 100 mW;
- compact and easy to operate;
- control interfaces: USB, TTL on/off;
- easy integration into users' equipment.

Applications

- spectroscopy and interferometry of various types;
- full field OCT and 3D microscopy;
- industrial OCT;
- testing of optical components (splitters, photodiodes, FBGs, etc.);
- optical sensing, including FBG.

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Swept wavelength tunable laser models

Parameter	Units	TECL790.55-3 TRCL790.55-3	TECL840.75-3 TRCL840.75-3	TECL930.115-3 TRCL930.115-3	TECL1060.70-3 TRCL1060.70-3
Wavelength tuning range	nm	770 – 825	805 – 880[a]	880 – 995	1020 – 1090
Set wavelength accuracy	nm	0.01	0.01	0.01	0.01
Fiber type		PANDA PM850	PANDA PM850	PANDA PM850	PANDA PM980
Output optical power	mW	3	3[a]	3	3
Power change over the tuning range	%	±10			
Tuning/sweep speed (changeable)	nm/s	1 – 10000			
Tuning/sweep speed setting accuracy	nm/s	1			
Minimum tuning range (continuous tuning, changeable)	nm	5			
Linewidth (FWHM)	nm	≤ 0.05[b]			
Peak-to-ASE excess, any wavelength within the tuning range	dB	> 30 (TECL) > 60 (TRCL)			
Signal-to-ASE ratio (integral), any wavelength within the tuning range	rel. units	> 9:1 (TECL) > 99:1 (TRCL)			
Output PER	dB	≥ 15			
Output optical connector		FC/APC, narrow key (2.0 mm)			
Built-in modes		Manual wavelength tuning Wavelength sweeping, internal triggering Wavelength sweeping, external triggering			

[a]Models providing 10 mW output power with 820 – 860 nm tunability, and 20 mW output power with 825 – 850 nm tunability are available on request.

[b]Building a version of TRCL840.75-3 with ≤ 0.005 nm linewidth is possible on request (805 – 880 nm tunability). In this case, only continuous sweep mode of operation at a factory-set fixed sweep speed is available.

Booster optical amplifier models

Parameter	Units	BST790.55-20	BST840.75-20	BST840.50-50	BST840.30-100	BST930.115-20	BST1060.70-20
Central wavelength	nm	790 ± 5	840 ± 5	840 ± 5	840 ± 5	935 ± 5	1055 ± 5
Gain bandwidth	nm	55 ± 2	75 ± 2	50 ± 2	30 ± 2	115 ± 2	70 ± 2
Output optical power	mW	20	20	50	100	20	20
Fiber type		PANDA PM850					PANDA PM980
Input optical power	mW	1.5					
Peak-to-ASE excess, any wavelength within the tuning range	dB	> 20 (with TECL as a seed laser) > 30 (with TRCL as a seed laser)					
Signal-to-ASE ratio (integral), any wavelength within the gain bandwidth	rel. units	> 2:3 (with TECL as a seed laser) > 9:1 (with TRCL as a seed laser)					
Output PER	dB	≥ 15					
Optical connectors		FC/APC, narrow key (2.0 mm)					

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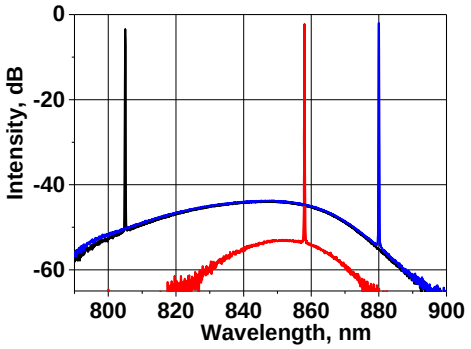
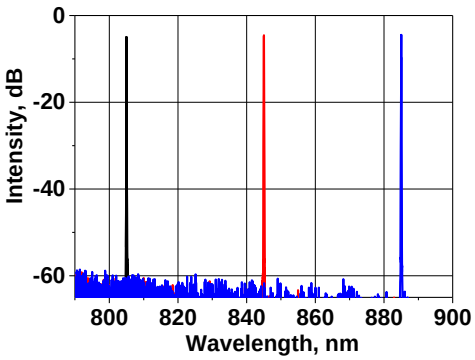
Typical performance examples

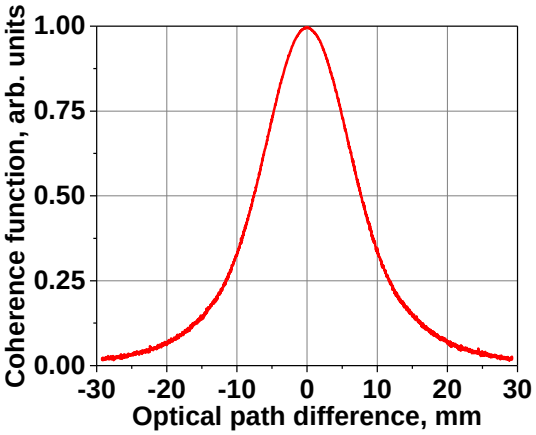
Optical spectra for TECL series (for TECL840.75-3)



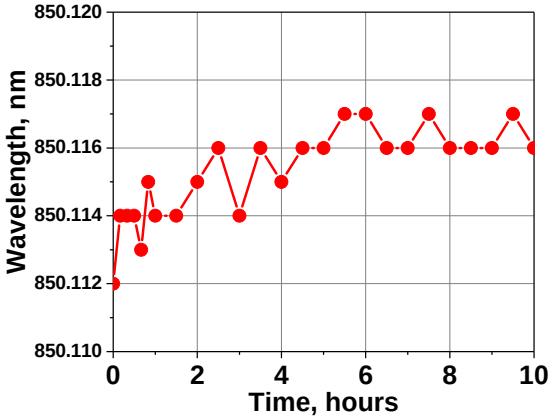
Optical spectra for TRCL series (for TRCL840.75-3)



Typical coherence function (for TECL840 and TRCL840)



Long term wavelength stability (no warming up, 22 ± 2 °C ambient, for TECL840 and TRCL840)



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