DUAL-WAVELENGTH FIBER LASERS FOR CARS & SRS MICROSCOPY



	DWFL-2022s	DWFL-2022i	DWFL-2010	DWFL-2010 SRS	
Tuning range (wavenumbers)	600cm ⁻¹ 2250cm ⁻¹		2750cm ⁻¹ 3150cm	⁻¹ 600cm ⁻¹ 3300cm ⁻¹	
Output wavelength range (pump)	845nm992nm	1039nm1053nm	775nm806nm	Typically between 600nm and 1100nm	
Output wavelength range (Stokes)	1027nm1033nm	1039nm1053nm	1120nm1350nm	Typically between 600nm and 1100nm	
Spectral width (pump)	<15cm ⁻¹	<6cm ⁻¹	<45cm ⁻¹	<15cm ⁻¹	
Spectral width (Stokes)	<6cm ⁻¹	<3cm ⁻¹	<15cm ⁻¹	<10cm ⁻¹	
Repetition rate (pump)	Typically 10MHz			18MHz	
Repetition rate (Stokes)	Typically 10MHz			36MHz	
Tuning speed	<5s for a scan over the entire tuning range				
Average power (pump)	>50mW	>100mW	>100mW	>200mW	
Average power (Stokes)	>100mW	>30mW	>150mW	>500mW	
Average power stability	<1.5% RMS over 1h				
Pulse duration (pump)	<30ps	<70ps		<40ps	
Pulse duration (Stokes)	<70ps	<30ps	<40ps		
Polarization	Linear				
Beam quality (pump & Stokes)	M ² < 1.3 (fiber-coupled)			M ² < 1.3	
Spatial overlap	Overlapped or independent outputs possible				
Temporal overlap	Passively overlapped or actively adjustable to compensate dispersion effects in attached microscope				
SRS extension	Available as options RIN <-145dBc/Hz at f _{rep} /2	-		Available as options RIN < -145dBc/Hz at f _{rep} /2	
Power tunability	Outputs can be tuned independently from 0 to full power while maintaining pulse duration and bandwidth				
Control interface	Software, RS232, USB, customizable				
Dimensions (W × D × H)	Approx. 400mm × 350mm × 150mm			Approx. 750mm × 750mm × 250mm	
Mass	<20kg			<70kg	
Miscellaneous	<500W power consumption / air-cooled / <1min warm-up time				

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DUAL-WAVELENGTH FIBER LASERS FOR CARS & SRS MICROSCOPY





ADVANTAGES OF DUAL-WAVELENGTH SOURCES FROM AFS

- Intrinsically synchronized pulses
- Alignment-free all-fiber frequency conversion
- Compact & robust
- Tuning over entire range within seconds
- NO warmup time
- Fiber-coupled output options available
- Easy-to-use control software

APPLICATIONS

- CARS spectroscopy and microscopy
- Microscopic multi-modal nonlinear imaging (CARS, SHG, TPEF)
- SRS microscopy





Courtesy of IPHT Jena



EXEMPLARY IMAGES CARS: CH-stretching vibrations

- lipid plaques
- nr-background: <10%
 SHG from collagen
 TPEF signal of elastin



Multimodal composite image of human connective tissue showing an overlay of CARS (red), SHG (blue) and TPEF (green) signals. Courtesy of IPHT Jena



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