



TECHNOLOGY TRANSFER OFFER

of Wrocław University of Science and Technology

FEMTOSECOND ER:FIBER LASER AT THE CENTRAL WAVELENGTH AROUND 1530 NM

SECRET KNOW-HOW: How to build and operate a femtosecond Er: fiber laser at the central wavelength around 1530 nm.

AUTHORS: Jakub Bogusławski, Grzegorz Soboń



THE OFFER INCLUDES

- (1) Confidential know-how on how to operate a femtosecond Er: fiber laser at the central wavelength around 1530 nm.
- (2) Exemplary implementation of the laser cavity operating at the central wavelength around 1530 nm, including bill of materials and instructions on how to assemble the laser.
- (3) 5 h of consultations during the process of implementation.



LASER OUTPUT CHARACTERISTICS OBTAINED IN THE EXEMPLARY CAVITY IMPLEMENTATION

- Central wavelength: $1531.6 \text{ nm} \pm 2 \text{ nm}$
- Optical bandwidth: $8.1 \text{ nm} \pm 2 \text{ nm}$
- Pulse duration: $\sim 312 \text{ fs}$ (sech²)
- Repetition rate: $\sim 60 \text{ MHz}$ (can be adjusted)
- Output average power: $\sim 4 \text{ mW}$
- Power stability: 0.25% RMS (over 1 h) (determined by the stability of the pump diode and its driver)



COMMERCIALIZATION FORM

- Sales of the IP
- Exclusive License
- Non-exclusive License
- Other



OTHER NOTES AND REMARKS

- > The laser is mode-locked using SESAM. Depending on the manufacturer's specification, SESAM is a delicate component that may be prone to optical damage or other typical effects affecting SESAM mode-locked oscillators.
- > The laser output parameters may slightly differ from those provided in the example determined by the variability of the parameters of the components used for constructing the laser.
- > The laser is mode-locked at higher pump power ($\sim 300 \text{ mW}$) in multiple-pulse mode. To obtain single-pulse operation it is necessary to reduce the pump power ($\sim 150 \text{ mW}$). In the exemplary implementation fluence at the SESAM is below $50 \mu\text{J}/\text{cm}^2$ (in the single-pulse mode).



FEATURES OF THE PROPOSED TECHNOLOGY

- > The technology allows one to build and operate a femtosecond Er: fiber laser at the central wavelength of around 1530 nm.
- > The proposed method of operating the laser at the central wavelength $\sim 1530 \text{ nm}$ is not limited to the exemplary implementation of the cavity; it can be applied to other cavity geometries as well, including other saturable absorbers/mode-locking mechanisms.
- > Technology readiness level: 4 (verification of technology components in laboratory conditions).
- > Exemplary implementation of the cavity is mode-locked by a semiconductor saturable absorber mirror (SESAM).
- > Exemplary implementation of the cavity features optical monitor output.

