

TeraXion

An indie Semiconductor Company

All-Fiber Notch Filter for Tandem-Pumping Applications

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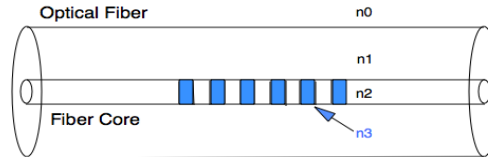
ABOUT US

- » Founded in 2000
- » **Design and manufacture innovative photonic components**
 - » Lasers for Material Processing
 - » Optical Sensing
 - » Optical Communications
- » 200 employees
- » Located in Quebec City
- » An indie Semiconductor company



CORE TECHNOLOGIES

Fiber
Bragg
Gratings



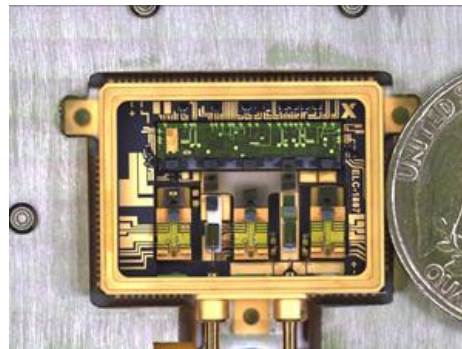
- *Foundation of the company*
- *Volume manufacturing*

Low Noise
Lasers



- *Low-noise electronics*
- *Low-noise laser chip*

Integrated
Photonics



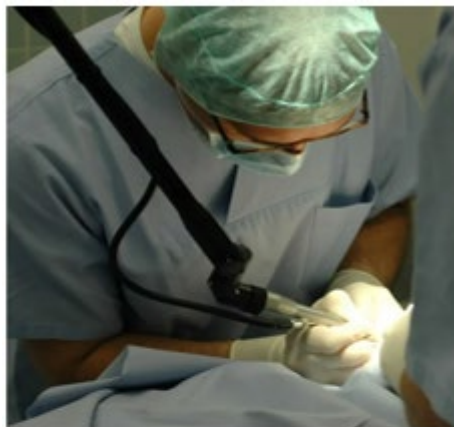
- *Micro-optics packaging*
- *Silicon Photonics (SIP) design*

HIGH POWER FIBER LASER COMPONENTS – MARKET SERVED

INDUSTRIAL



MEDICAL



DEFENSE



R&D/ACADEMIC



WSF - PRODUCT OVERVIEW

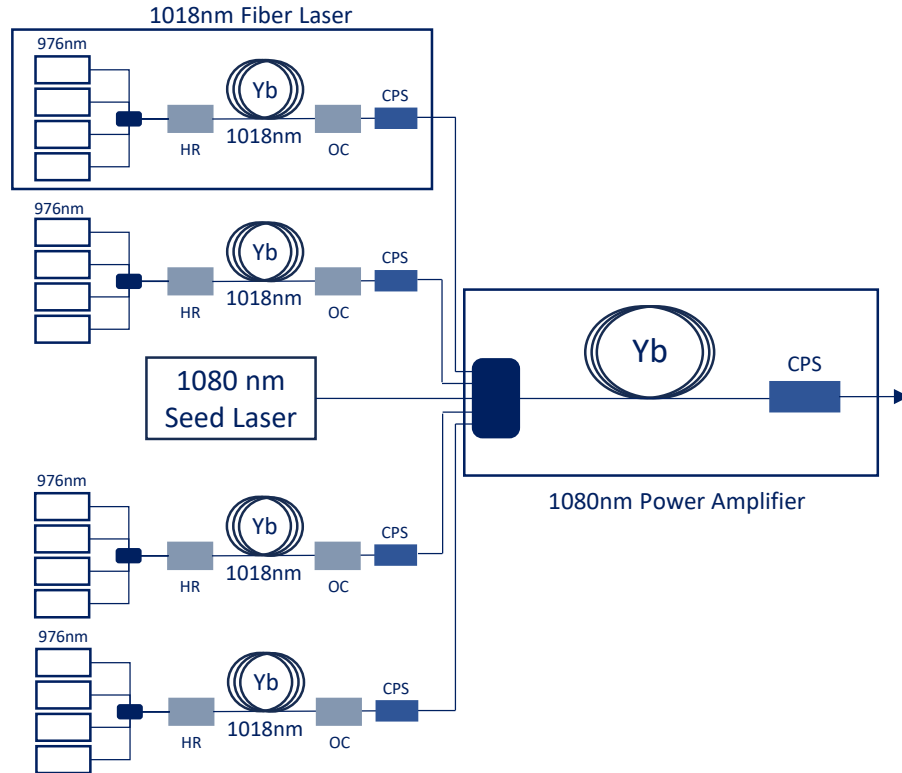
The WSF series of wavelength suppression filters are notch filters that allow to block the transmission of a wavelength or a range of wavelengths over a specified bandwidth



FBG-based All-Fiber Notch Filter

TYPICAL APPLICATION: TANDEM-PUMPED FIBER LASERS

What is it?



Tandem-pumped lasers use multiple pump sources at different wavelengths to efficiently stimulate the gain medium within the fiber

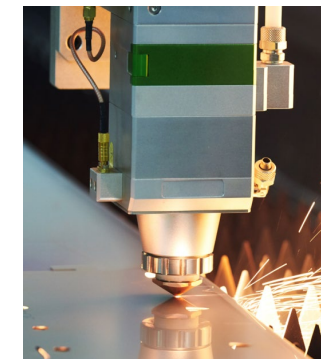
Why use it?

In 2009, IPG Photonics was the first to demonstrate a 10kW nearly single mode fiber laser through a tandem-pumping configuration

Seen as one of the most promising techniques for enhancing the output power of single-mode fiber lasers operating at $1\mu\text{m}$



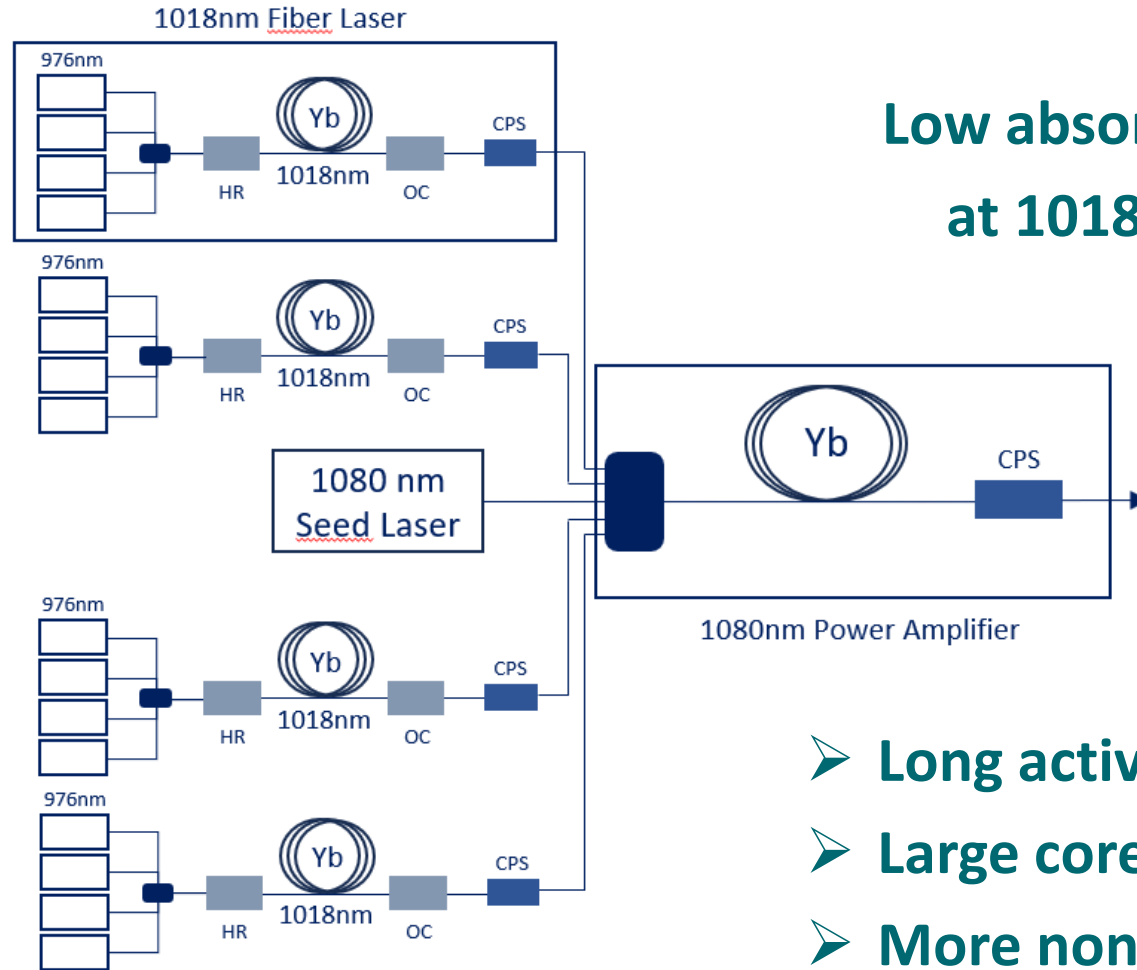
DEW



Cutting&Welding

THE PROBLEM

Tandem-pumped
fiber lasers at 1
micron typically use
a forward pumping
configuration

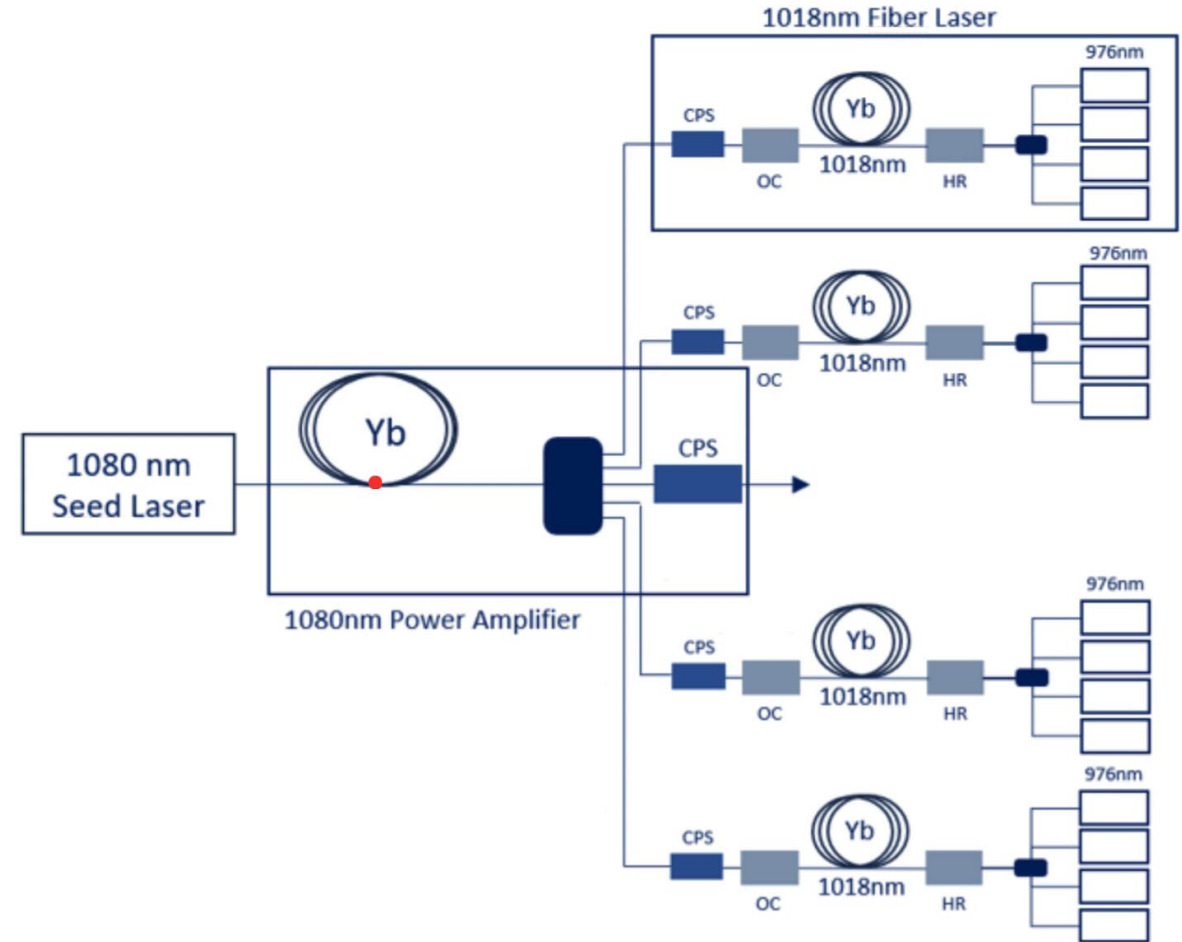


THE PROBLEM

So, a backward-pumping configuration would be quite advantageous to reduce non-linear effects such as SRS and TMI

BUT!

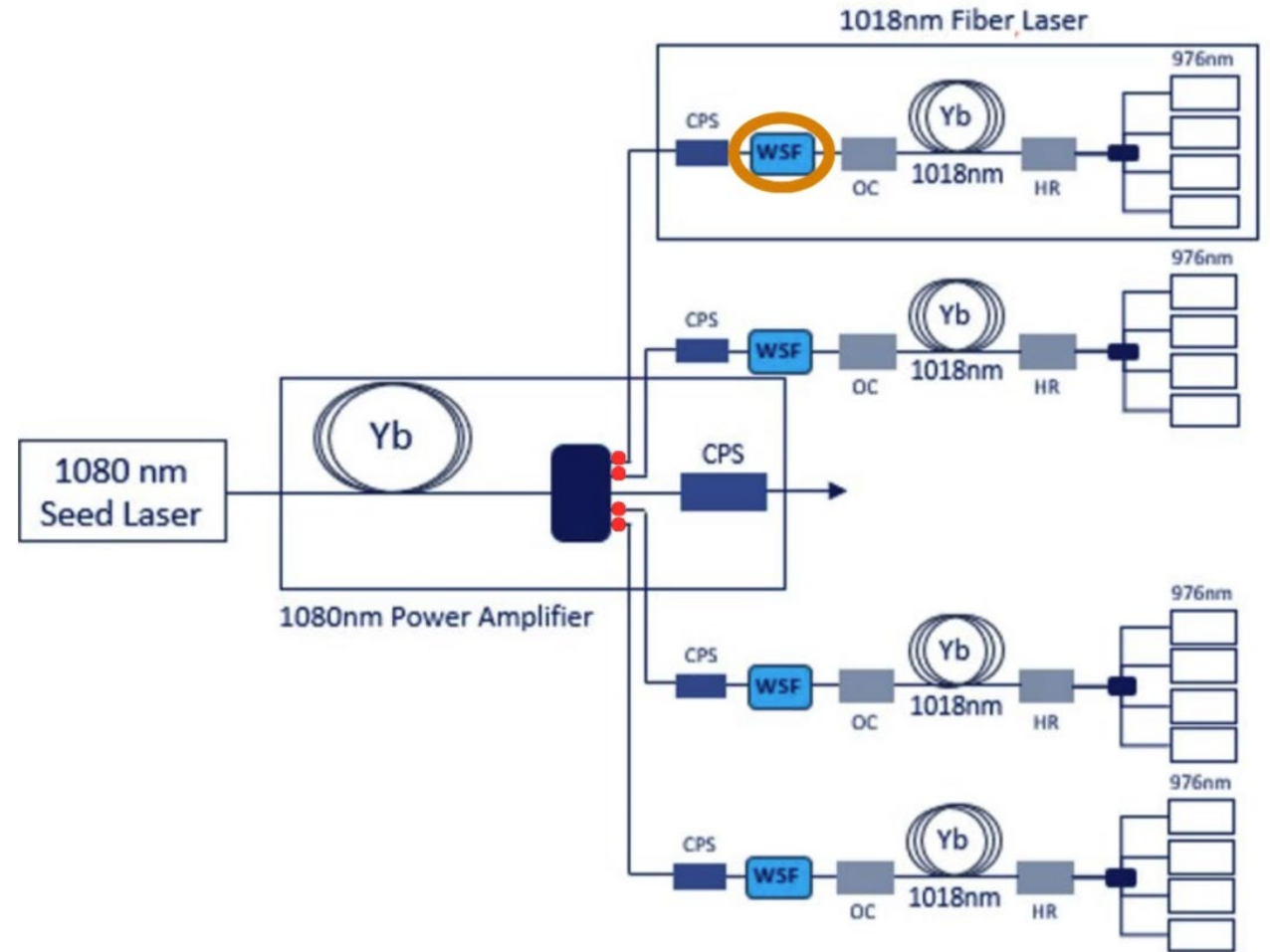
Back-propagating 1080 nm laser signal from power amplifier can adversely affect the operation of the 1018nm fiber lasers



OUR SOLUTION

The WSF blocks the counter-propagating 1080nm signal in the power amplifier from coming back into the 1018nm fiber laser cavity

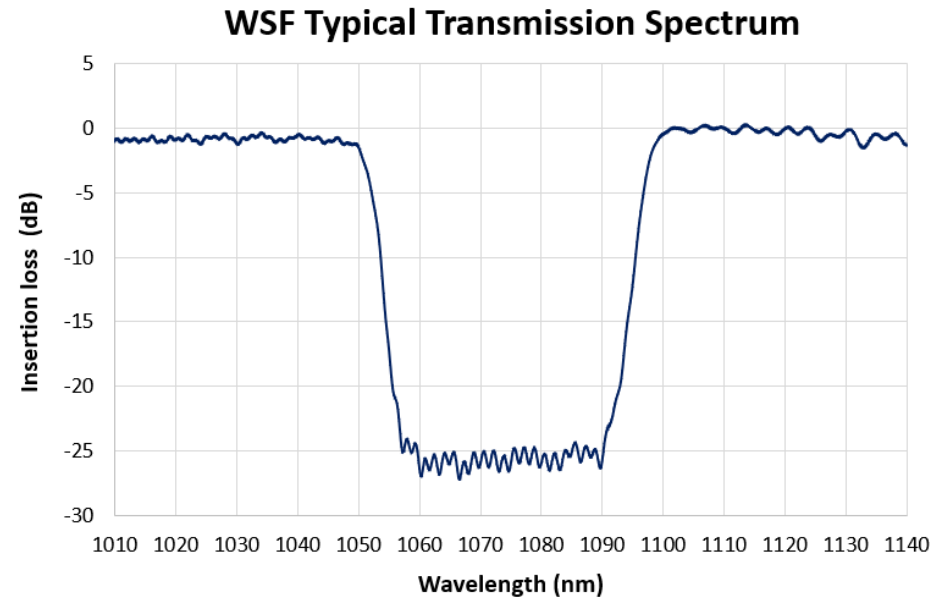
The WSF guides this counter-propagating signal into the cladding at the output of the WSF where it can safely be extracted by the CPS



WSF ADVANTAGES

Advantages

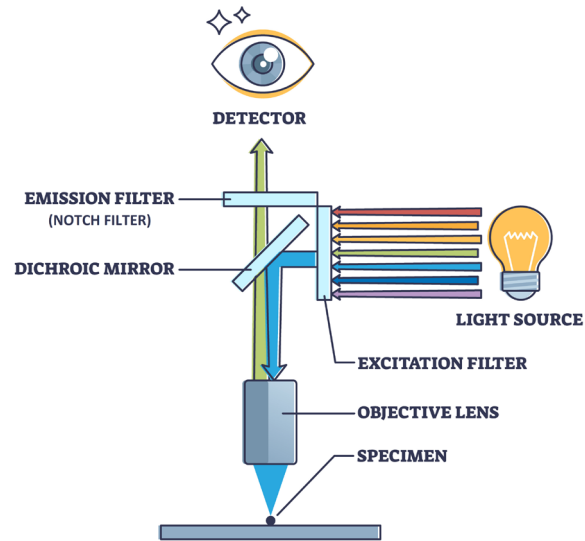
- All-fiber solution
- High power handling (kW)
- In-line (no circulator needed!)
- Low insertion loss ($\leq 0.15\text{dB}$)
- Low return loss
- Available at different wavelengths and configurations to match your application requirements



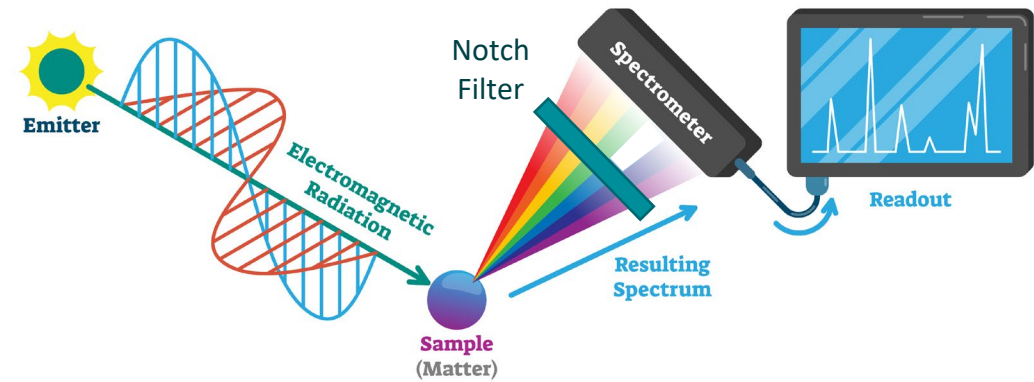
Other solutions such as thin-film filters or high-power isolators could be used but are quite limited in terms of power handling

OTHER APPLICATIONS

The WSF band-stop filters may be useful in other applications including multi-wavelength laser systems, spectroscopy, fluorescence imaging, and other life sciences and scientific applications



FLUORESCENCE IMAGING



RAMAN SPECTROSCOPY

SPIE. PHOTONICS
WEST

BOOTH: 3413

Thank you!

Download App Note

All-Fiber Filters for the Design of
Tandem-Pumped Fiber Lasers



Any Questions?

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