TeraXion
An indie Semiconductor Company

High Performance Spectral Filtering for Quantum Applications

Applications

- Quantum Key Distribution
- Atomic Clocks
- Quantum Computing
- Quantum Sensing
- Fundamental Research

Technologies

- Single-photon Sources
- Entangled Photons
- Optical Tweezers
- Cold Atoms/Ion Traps
- Diamond Defects

Background

Quantum science is a century-old field of study, but recent technological advancements led to the enablement of new techniques to tap into the endless potential of quantum mechanical properties expressed at the single particle level.

One can now exploit the quantum superposition and quantum entanglement principles to setup un-hackable communication links, to detect infinitesimal force shifts, or to solve complex problems that outweigh previous super-computers. This requires controlling single atoms/ions, electrons and photons with high finesse so that nothing interferes with the desired process

High quality optics is key in addressing this challenge, starting with the generation of “pure” photons with:

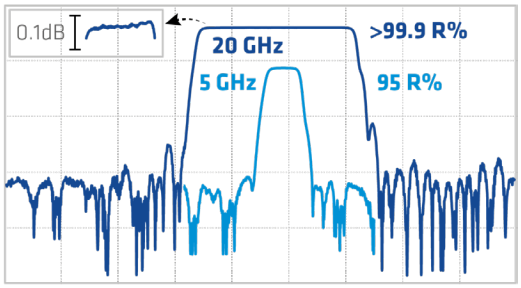
- An extremely well-defined spectral profile
- Minimal noise
- High isolation from initially co-generated signals
- Minimal pulse distortion

This calls for tailored solutions.

MKT-PROMO-TFN QUANTUM (1.0)_En

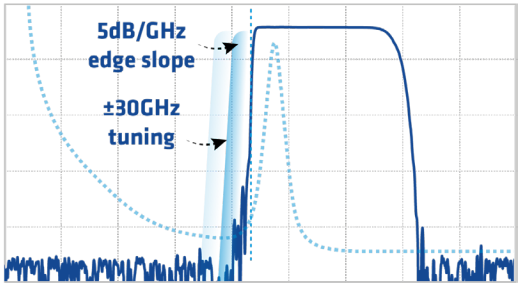
Objectives & Examples

High Reflectivity



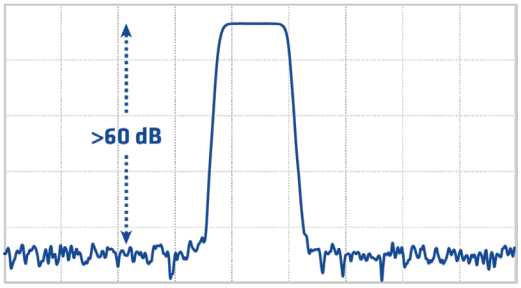
Maximize retrieval of targeted photons.

High Precision



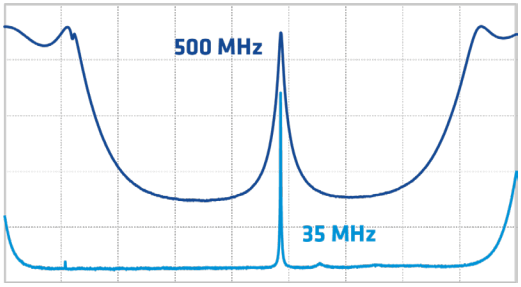
Filter out the unwanted with picometer precision.

High Isolation



Maximize SNR and contrasts between signals.

Ultra-selective



Extract the narrowest signals.

Solution

TeraXion's optical filters rely on Fiber Bragg Grating (FBG) technology, renown for enabling narrow bandwidths and high isolation in a practical and rugged format.

To these intrinsic advantages, TeraXion adds 20 years of optimizing design parameters and refining manufacturing skills to achieve unique features the most challenging applications require.

Finally, the **TFN** tunable platform confers the benefits of an ultimate precision on the band position and an easy integration into commercial products.

Reflection (R) module

Transmission + Reflection (T+R) module

Parameters	Values	Units
Center Wavelength λ	700 – 1000	nm
Bandwidth	2 – 100	GHz
Center Wavelength λ	1525 – 1610	nm
Bandwidth	35 – 500 2 – 100	MHz GHz
Tuning Range	±30	GHz
Tuning Resolution	2	pm
Reflectivity	50 – 99.9+	%
Isolation	20 – 70 (1)	dB
Fiber Type	PM or non-PM	

(1) Per FBG

CWL	Typical usage
700–1000 nm	• Atoms/Ions cooling & trapping • Quantum dots excitation & emission • Diamond defects emission • Entangled photons generation
1525–1570 nm	• Telecom C-band sources & detection • Entangled photons generation
1590–1610 nm	• Telecom L-band sources & detection • Entangled photons generation

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