



Phot*in*tech

Brings life to static components

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Photonique à onde évanescente

(Evanescent field photonics)

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- **Plan de la présentation**
 - Introduction (Entreprise et Technologie)
 - Applications
 - Produits
 - Conclusions

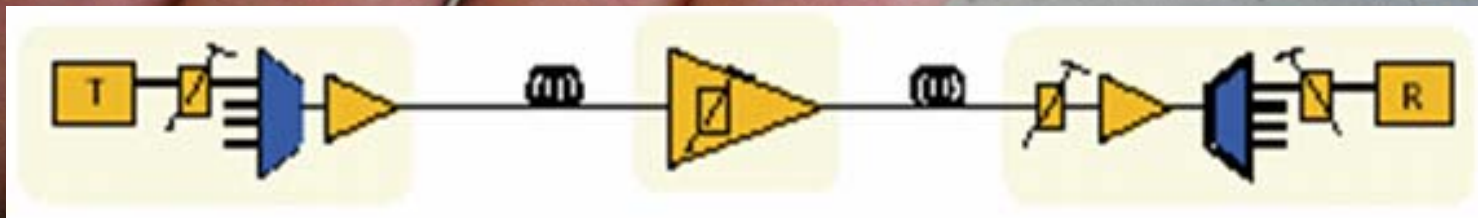


Company introduction

- **Started activities in 2001, Quebec, Canada**
 - **Platform R&D** (IP & Know-How, 2 patents + 7 patent applications)
- **Brand new facilities in Quebec's high-tech park**
 - **Production Line** (in operation)
 - **Product Development**
 - Clean Room, class 10000
 - Tests & measurements
 - **Research Laboratories**
 - Chemistry
 - Optoelectronics
 - Access to world class expertise & facilities
 - Cost effective R&D
 - **Research partners**
 - COPL

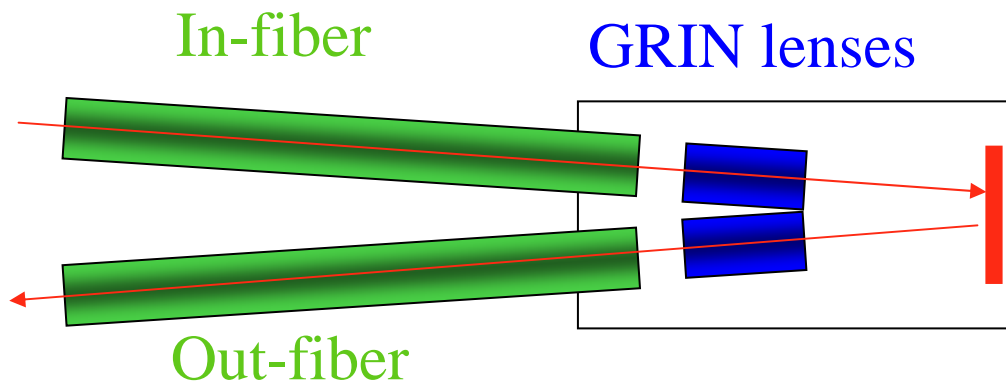


The most cost effective solution for
optical power management:
in-fiber
Variable Optical Attenuator
(VOA)

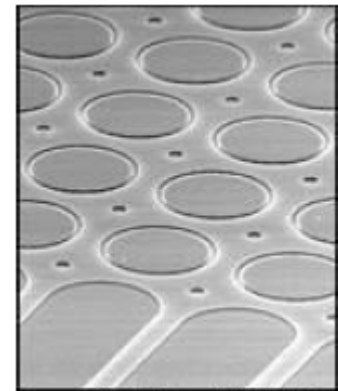


MEMS competition

(micro electro mechanical systems)



MEMS wafer



Diffractive MEMS

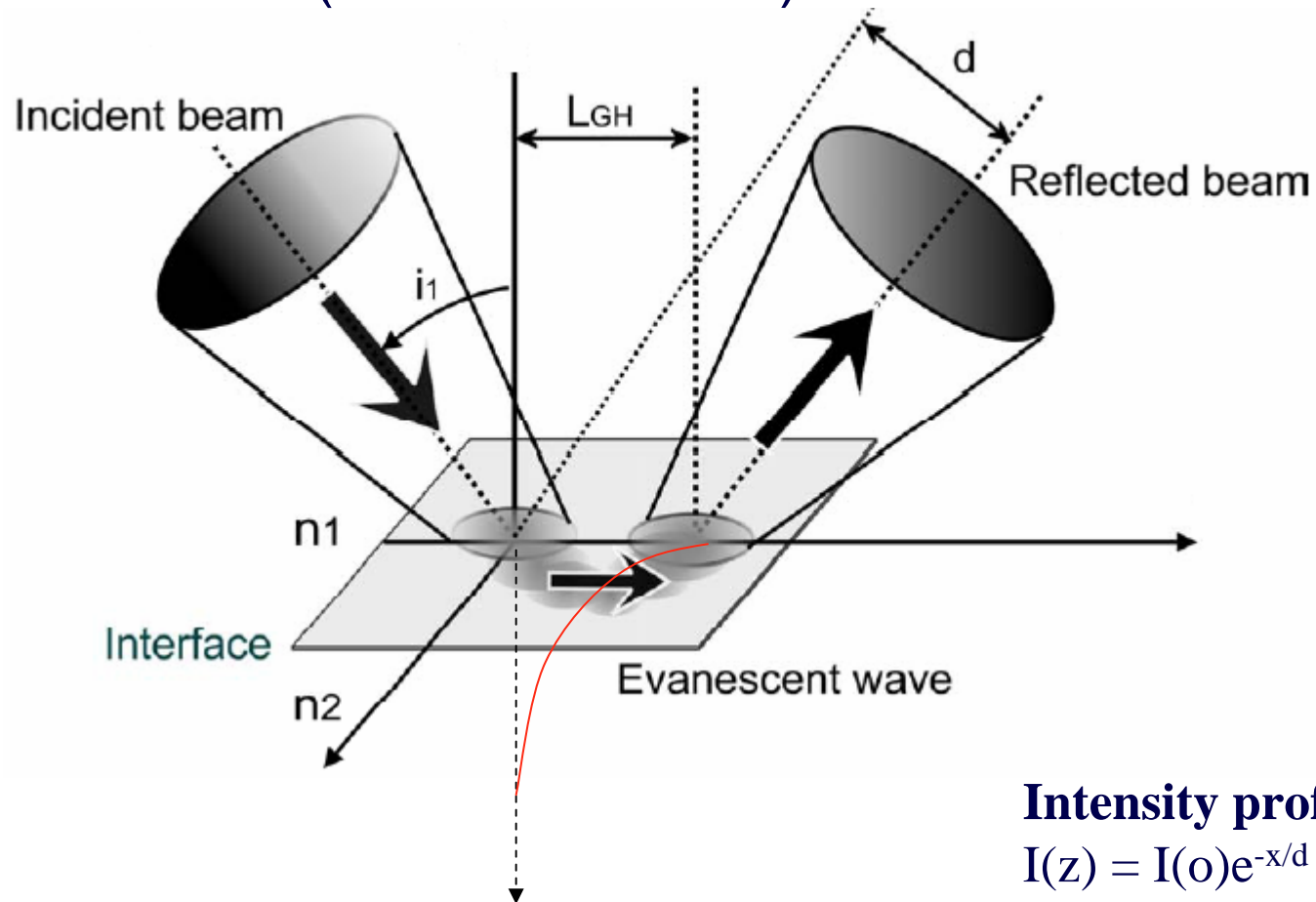


- Cost
- Vibrations
- Stitching

Evanescent Field

(Photintech's approach)

Goos-Hänchen (Imbert-Fedorov) shift...



Intensity profile :

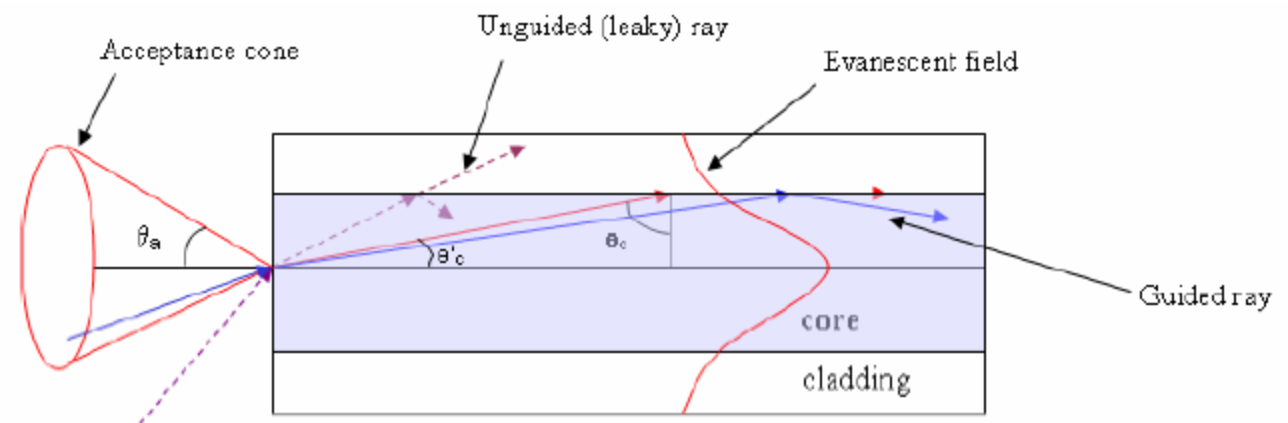
$$I(z) = I(0)e^{-x/d}$$

Penetration depth :

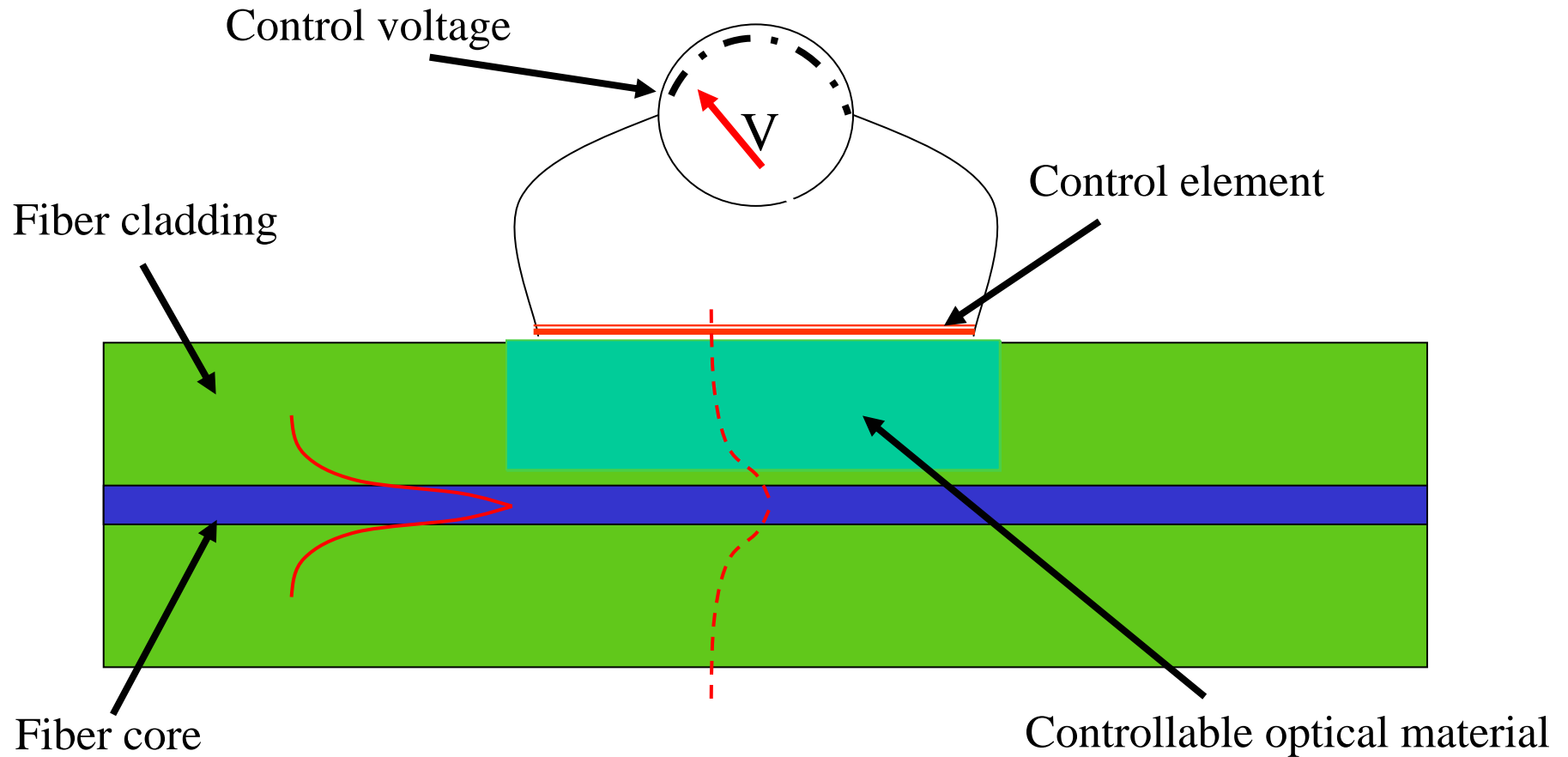
$$d = \lambda_0 [n_1^2 \sin^2 i_1 - n_2^2]^{-1/2} / 2\pi$$

Applications

- Total Internal Reflection Fluorescence Microscopy
- Bio and Chemical Sensors
- Near surface Velocimetry
- Non-linear evanescent-field Imaging
- Near-field optical Manipulation
 - Particle/Atom trapping, guiding and detecting
- **Guiding, coupling and modulation**



Technology : Fiber cladding control schematics



Controlled light leakage !

Key know-how and IP

behind the product:

Proprietary VOA : *architecture and method of making it*

Technical (performance)

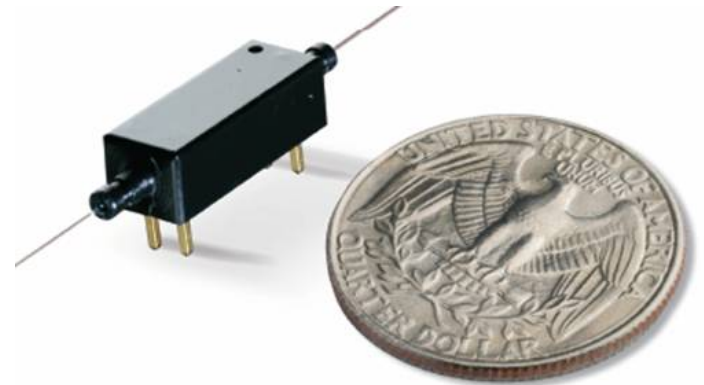
- Geometry
- Control element (*form & functions*)
- Controllable composite optical materials

Production (cost)

- Fiber micro-machining method
- Assembly and packaging methods

“In-fiber” technology advantages:

- Very **small** footprint (*smallest*)
- Very **low** insertion loss and back reflection* (*lowest*)
- Very **low** PDL and PMD* (*lowest*)
- **Unique** spectral control capacity
- **No** moving parts, totally “solid state”
- Environmentally **robust** and **simple** design
- Very **low** production cost (*even at low volume*)



MAY BE PRODUCED IN NORTH AMERICA...

Typical (not best) technical performances

- **Footprint :** 5 x 6 x 16 mm³
- **Insertion loss :** 0.15 dB
- **Attenuation range:** 50 dB
- **Back reflection :** 60 dB
- **PDL :** 0.15 dB @ 20 dB
- **WDL :** 0.01 dB/nm @ 20 dB
- **PMD :** 0.003 ps
- **Relaxation :** 40 msec
- **Positive & negative spectral tilts + flat (0.01 dB/nm)**
- **Environmentally robust**
 - -60°C to +120°C
 - +100 °C and 100% RH

Product roadmap



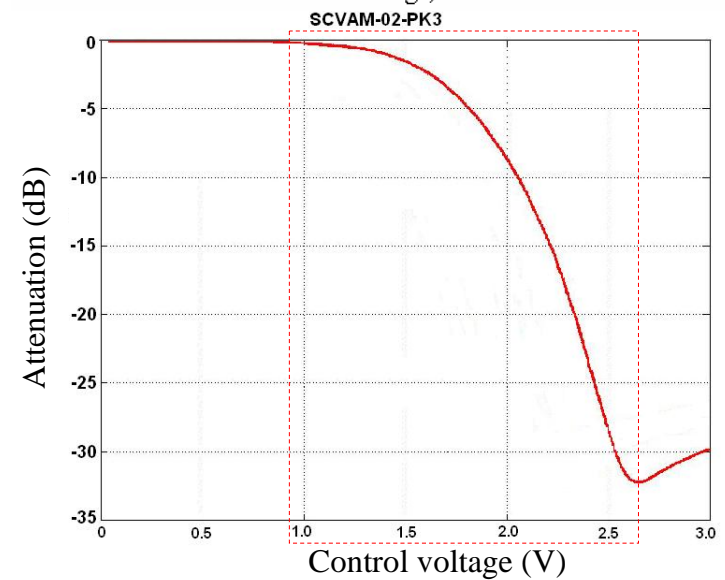
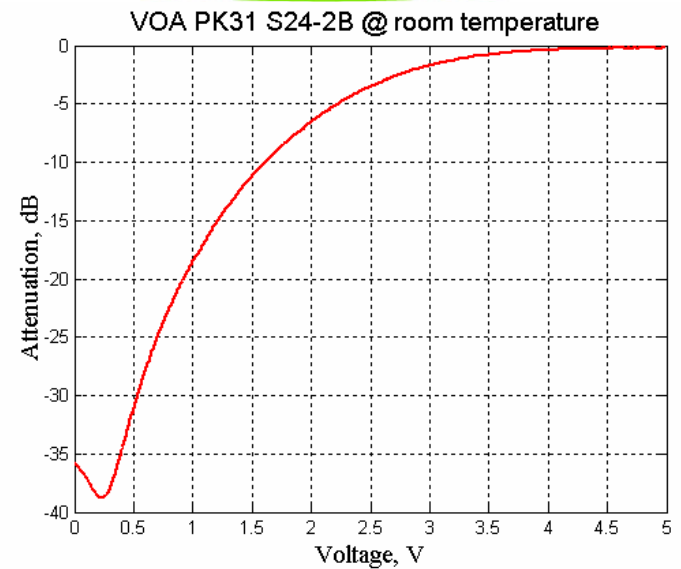
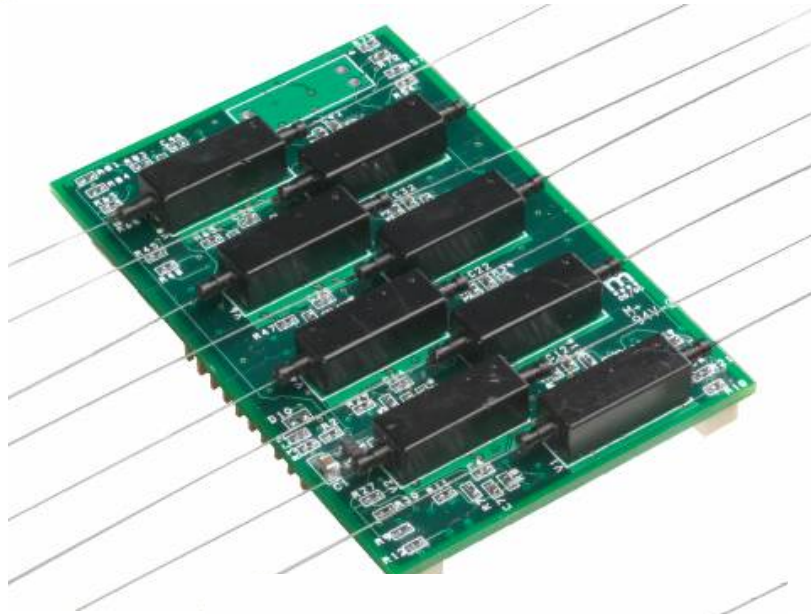
- **In production**

- 5 VOA device configurations (PK3; 4; 31; NC; MMF)
 - Single mode
 - Multimode
- VOA array modules (*simple & electrically conditioned*)

- **Products under development**

- Temperature sensors
- Band and Channel selective VOAs
- Tuneable Fiber Couplers / Splitters
- Tap Detectors

VOAs with Electrical Conditioning Circuits



Conclusions

- **Evanescent field approach is *simple* and *cost-effective***
- **It allows the development of variety of tuneable components**

Variable Optical Attenuators

Tuneable Couplers

Tap Detectors

Sensors

- **To be used in such areas as**

Communications

Industrial / Military

Test & Measurement

Sensing

Optical Bonding +



Thank you for your attention

Questions?

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