

## Multislot Waveguide Sensor

### Information Summary

*For review for potential collaboration and/or licensing*

#### Summary

**Technology Overview:** Multislot Silicon Waveguide Based Sensor operating in visible and IR range.

**Applications:** Bio-sensing for variety of Viruses and Bacteria, Environment Sensor, waveguide at IR range, water contamination sensor.

**Needs:** Food industry, commercialized biosensor industry, Monitoring environmental safety Lab, Defense industry, Photonics Chip industry.

**Ideal Partner or Receptor:** Sensor manufacturers, Silicon Photonics companies, Defense industry.

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- Enhanced microfluidic characteristics, which means faster response time, 4 times bigger slot size
- Huge waveguide effective modal index tunability suitable for coupling and non-coupling effects in an integrated silicon circuits
- Huge wideband waveguide suitable for broadband spectrum operation
- Huge potential for Micro-resonator based sensing application suitable for one cell detection
- Low loss IR waveguide and sensors
- Free material based waveguide, i.e. the absorption loss and modal effective index of the waveguide do NOT highly depend on the characteristics of waveguide material

#### Technology summary

Researchers at INRS have proposed a novel concept for slot waveguide enabling huge light/material, light/biomaterial, light/radiation interaction for sensing application. The multislot waveguide can be designed to operate at any wavelength range from visible to infrared, while a major part of the signal can be propagated as an evanescent field to enhance the light/material interaction and therefore sensitivity to the material under test. This silicon Photonics waveguide is very integratable in a silicon chip

#### Benefits

- Huge evanescent field or light/material interaction, up to 90%, at least 10 times more than other conventional waveguides
- Multi-wavelength cross-section, at least several times more than that of the current slot waveguide, thus easy light latching condition for commercial application

#### Market Need

Silicon Photonics waveguide with huge evanescent fields.

Sensor-on-Chip and Lab-on-Chip integratable bio-Sensors for visible to IR operating wavelength. Highly microfluidic optical waveguide based bio- and Environmental- sensors.

Water monitoring sensors at operating wavelength of IR and mid IR.

Food industry sensors with faster response time for food monitoring and bacteria detection using micro-resonator technics.

Low loss ideal waveguide for IR transmission where the material absorption is high.

Label free sensors.

Any type of very high sensitive sensors.

Radiation sensors.