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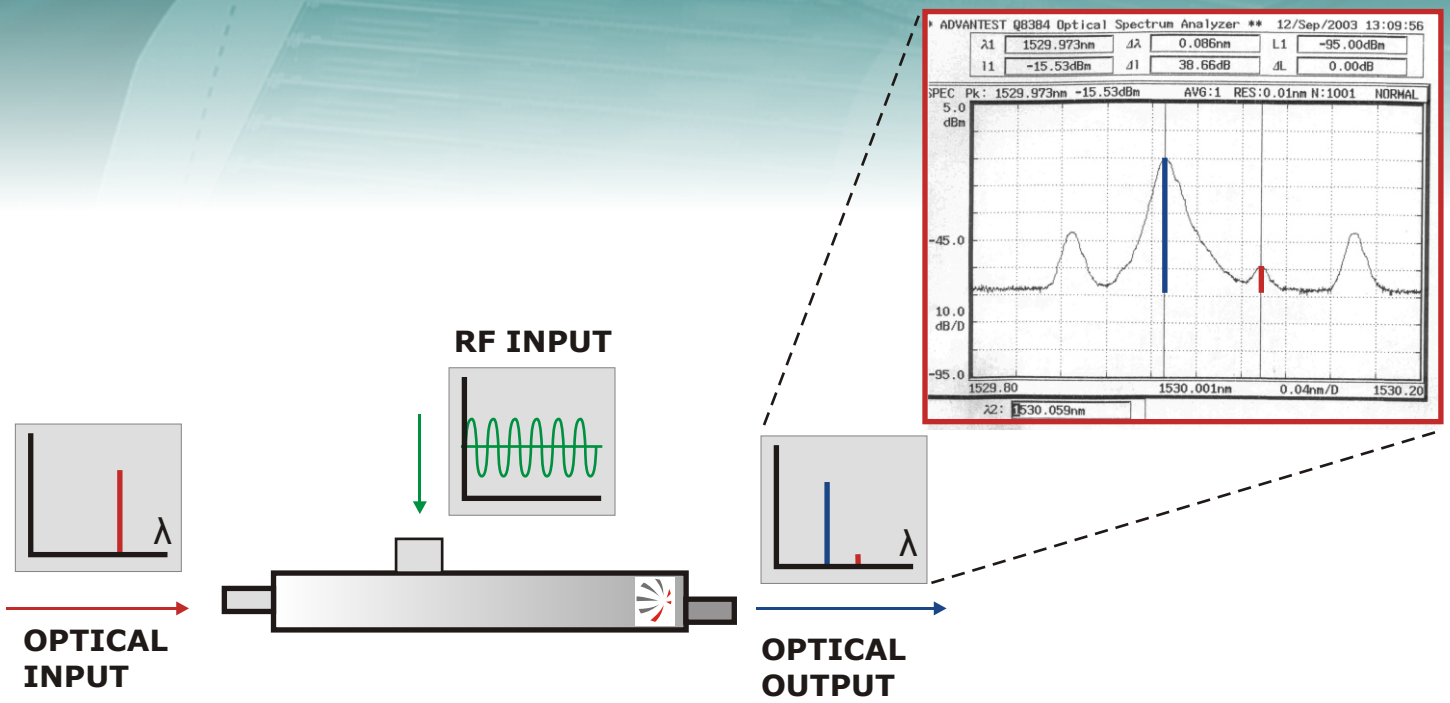
$LiNbO_3$ Photonic Foundry

Electro-optic frequency shifter



General principles

An electro-optic frequency shifter has been developed in AMS Photonics labs exploiting a long-lasting expertise in manufacturing $LiNbO_3$ electro-optic devices.
Target function of the component is translation in the frequency domain of an incoming optical carrier with an amount equal to the frequency of the input microwave signal.
Cancellation of the non-shifted carrier is achieved through the adjustment of an external DC bias.
The device being based on a resonant non-linear interaction, operating frequency can be chosen by design, with a relevant proportional bandwidth around that value.

Specifications

Operating frequency range*	5-12 Ghz
Proportional Bandwidth	20-25%
Conversion efficiency	-3dB
Maximum carrier suppression	-38dB

*Actual value can be chosen by design

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Applications

- Optical processing of microwave signals (wide band doppler generation, amplitude and phase control of optically carried mw signals, etc)
- Optical distribution of Local Oscillator for radar and radio-over-fiber applications
- Implementation of microwave mixing in optical domain
- Single side band optical modulation with suppressed carrier
- Optical sensors and spettroscopy

Keywords

- Non-linear optics, optical frequency conversion
- Advanced modulation schemes, microwave photonics

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