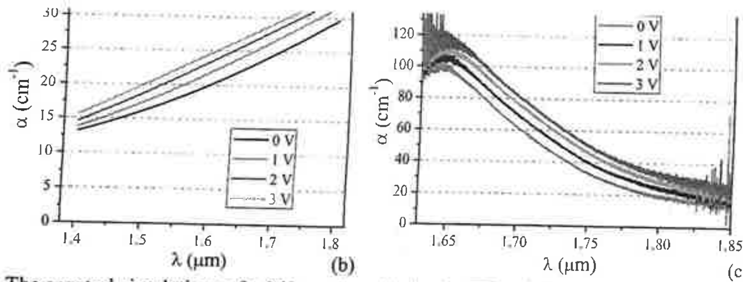

Fig. 3 (a) The spectral simulations of a 960 μm-long device for TE polarization. The measured spectra are also shown for comparison. (b) The total photon absorption of the QDs calculated by the rate equation model (for TE polarization). (c) The measured absorption spectra for different reverse-bias voltages (for TE polarization, including pure propagation loss of the optical mode).

Conclusion

In this paper we have presented the simulation results of QD photodetectors using a modified QD amplifier rate equation model as well as comparison to experimental results. A major modification of this model is the change from carrier injection to the carrier extraction of the dots. The simulations of responsivities with various lengths showed a good match with the measurement results using only one fitting parameter. The relation between carrier extraction rate and reverse-bias voltage was determined. Simulations on the spectral responses were also performed. The model matched well with experiments in the long wavelength region but showed an obvious deviation in short wavelength region. This is attributed to the underestimation of the contributions from higher energy states of the dots and possibly the wetting layer.

Acknowledgements

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Compact 16×16 channels Routers based on Silicon-On-Insulator AWGs.

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We demonstrate an ultra small 16×16 *channels* 400 *GHz wavelength Router on SOI. Insertion loss from center channel input to center channel output, non-uniformity over outer most output channel to center channel output and non-uniformity over outer most input channel to center channel input are* $-3.00dB$, $2.09dB$ *and* $1.79dB$ *respectively. Crosstalk of the device is* $20dB$. *The device size is only* $475 \times 330\mu m^2$.

Introduction

Arrayed Waveguide Gratings(AWG) are one of the vital components in WDM systems, which have high commercial interest because of high transmission capacity and more flexibility in the telecommunication network. AWG works as both wavelength division multiplexer and demultiplexer. With an appropriate combination of two free propagation region (FPR) and an array of waveguides with a linear increment of length makes an AWG. Dragone in 1991 extended the concept of AWG from $1 \times N$ channels to $N \times N$ channels device, which is popular as a wavelength routers [1] [2]. Figure 1 shows a schematic diagram of a 16×16 channels 400 GHz wavelength Routers.

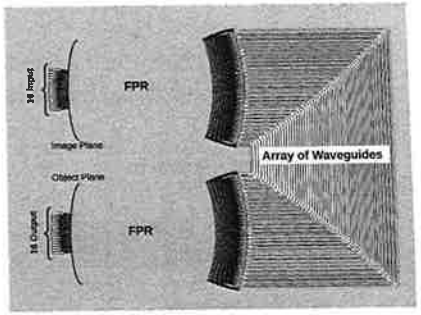
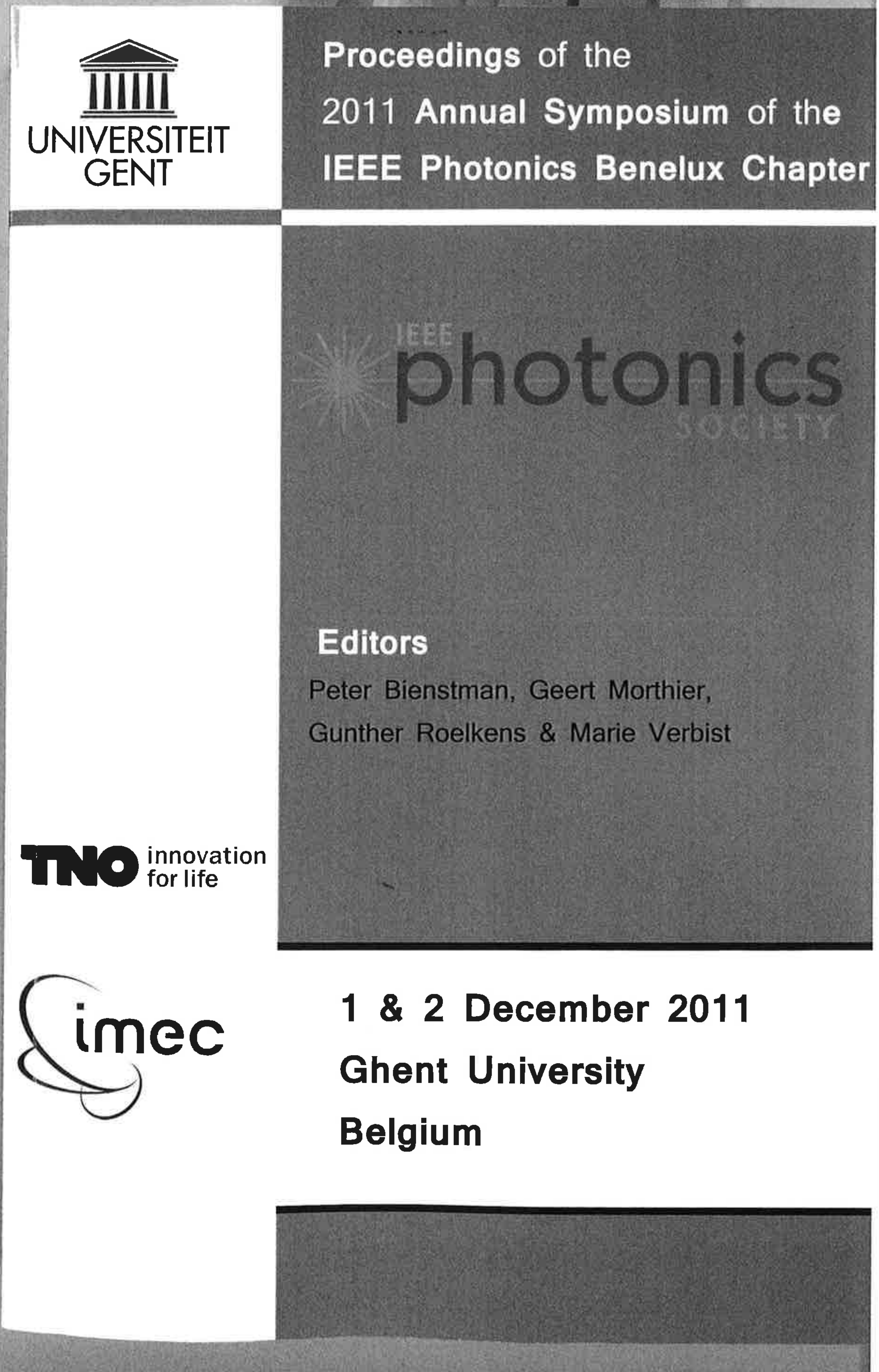


Figure 1: Schematic diagram of a 16×16 channels 400 GHz wavelength Routers.

In SOI due to the sharp bend radius[3] and the high group index of the waveguides makes the router very compact but sensitive to phase noise. So demonstration of such a device in SOI platform is difficult.

Working Principle

The operation of the regular AWG is described as follows. A light beam propagating through the waveguide enters into the first star-coupler and diverges. This diverging light beam is coupled in the arrayed waveguides and propagates to the second star-coupler. The



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