

Contents

Resumen	i
Resum	iii
Abstract	v
Acknowledgements	vii
Table of contents	x
Motivation	5
1 Silicon Modulators	7
1.1 Introduction	7
1.2 Design Passive Components	9
1.3 Phase shifter and modulator design	14
1.4 Fabrication and Measurements	23
1.5 Conclusions	30
2 Asymmetrical MMI	35
2.1 Background and design	35
2.2 Measurements and Analysis	37
2.3 Modulator with A-MMI	41
2.4 Modulator with A-MMI results	43
2.5 Conclusions	47
3 1D Photonic crystal design	53
3.1 Background	53

3.2	Slow light structure design	55
3.3	Single Apodization	59
3.3.1	Setup	61
3.3.2	Results	61
3.3.3	Results - Partial Tapers	70
3.4	Double Taper Apodization	74
3.4.1	Double Taper Design	75
3.4.2	Double Taper - Measurements and Discussion	78
3.5	Conclusions	85
4	Conclusions and outlooks	93
	Appendices	95
A	1D-PhC Graph Appendix	97
B	Silvaco code	101
B.1	ATHENA & ATLAS simulation code	101
C	FDTD	109
C.1	2D-FDTD Code	109
D	Mode Solver 2D	121
D.1	Code Mode Solver	121
E	Publications	135
	List of Figures	142
	List of Tables	144