

Table of contents

Acknowledgments.....	i
Abstract	iii
Resumen.....	v
Resum	vii
Table of contents.....	ix
CHAPTER 1 Introduction	1
CHAPTER 2 Fundamentals of stimulated Brillouin scattering	3
2.1. Theory of SBS.....	4
2.1.1. Brillouin Threshold.....	9
2.1.2. Polarization Effects on SBS	10
2.1.3. Pump depletion	12
2.1.4. SBS model	12
2.2. Applications	13
2.2.1. Brillouin lasers	14
2.2.2. Distributed fiber sensors	14
2.2.3. Delay lines	15
2.2.4. High-resolution spectral analysis	15
2.2.5. Optical processing of microwave signals.....	16
CHAPTER 3 SBS-based All-optical Polarization Control	17
3.1. Review of All-Optical Polarization Control.....	17
3.2. New SBS-based Polarization Control.	18
3.2.1. Introduction.....	18

3.2.2.	Principle	19
3.2.3.	Experimental results.....	25
3.3.	Conclusion.....	32
CHAPTER 4 SBS-based Photonic Microwave Filtering		34
4.1.	Photonic Microwave Filtering	34
4.2.	Review of SBS-based Photonic Microwave Filtering	35
4.3.	Photonic microwave filter with steep skirt selectivity based on stimulated Brillouin scattering.....	37
4.3.1.	Introduction	37
4.3.2.	Photonic microwave filter architecture	37
4.3.3.	Experimental results	41
4.3.4.	Conclusions	45
4.4.	Brillouin Microwave Filter with enhanced Skirt Selectivity using a Birefringent Fiber.....	45
4.4.1.	Introduction	45
4.4.2.	Principle of Operation	46
4.4.3.	Theory	46
4.4.4.	Experimental Results.....	50
4.4.5.	Conclusion.....	53
4.5.	Wide tunable photonic microwave notch filter based on Brillouin polarization controller.....	54
4.5.1.	Introduction	54
4.5.2.	Principle of operation	54
4.5.3.	Experimental results	55
4.5.4.	Conclusion.....	57
CHAPTER 5 Conclusions and future outlook.....		58
Appendix I Polarization Optics		60
I.1	Polarization Optics.....	60
I.1.1	Jones Vector.....	62
I.1.2.	Stokes parameters	65

I.1.3. Poincaré sphere	66
List of publications	69
References.....	70