

Contents

Acknowledgments	3
Contents	1
Chapter 1 Introduction.....	6
1.1. Plasmonics.....	7
1.2. Nanoantennas	8
1.3. Silicon photonics	11
1.4. Combining plasmonics and silicon photonics	12
1.5. Motivation and objectives	16
Chapter 2 Guided modes in silicon waveguides: longitudinal components and transverse spin.....	19
2.1. Introduction	19
2.2. Description of the concept.....	20
2.3. Numerical results.....	25
Chapter 3 Embedding plasmonic nanoantennas in silicon waveguides	29
3.1. Introduction	29
3.2. Description of the concept.....	31
3.3. Numerical results.....	33
3.4. Experimental results	40
Chapter 4 Coherent control of plasmonic nanoantennas	45
4.1. Introduction	45
4.2. Coherent control of absorption, scattering and transmission	48
4.2.1. <i>Description of the concept.....</i>	<i>48</i>
4.2.2. <i>Numerical results.....</i>	<i>53</i>
4.2.3. <i>Experimental results.....</i>	<i>59</i>
4.3. Coherent synthesis of scattering polarization.....	63
4.3.1. <i>Description of the concept.....</i>	<i>63</i>
4.3.2. <i>Numerical results.....</i>	<i>65</i>
4.3.3. <i>Experimental results.....</i>	<i>66</i>

Chapter 5 Optimal Stokes polarimetry implemented on silicon nanoantennas.....	69
5.1. Introduction	69
5.2. Description of the concept.....	70
5.3. Numerical results.....	76
5.3.1. <i>Optimization of the nanopolarimeter</i>	83
5.4. Experimental Results.....	88
Conclusions and future work.....	98
Methods.....	102
Numerical simulations	102
Near field measurements	102
Fabrication.....	103
Fundings	104
References.....	105
Author’s merits	119
Journal paper’s.....	119
Conferences	119
Intellectual property.....	121
Abstract.....	122
Resumen.....	123
Resum.....	124