Preface

This thesis is divided in six chapters, followed by a conclusion and complemented by four appendices.

The first chapter consists of an introduction to the rest of the material and reports a review of the work published by other scientists, which is relevant to this study. Chapter 2 lays the foundations of the theoretical investigation of the butterfly microstructure and reports on the study of two particular crystal lattices. In chapter 3, the development of fabrication processes and their use in the production of novel devices is presented. Chapter 4 reports on the experimental work and includes both the construction of a novel method for the spectroscopical analysis of scattering and the results of investigations on natural and artificial structures. The application of a numerical method for the study of the diffraction is presented in chapter 5. The results from previous chapters are collated and discussed in chapter 6. Finally, the conclusion contains a brief summary of the thesis and suggestions for future work. Throughout the thesis several references are made to the material in the appendices and to the bibliography at the end of the manuscript. Extensive lists of symbols for each section of the thesis and a list of acronyms has been provided.