

CONTENTS

	page
Abstract	1
Introduction	3

CHAPTER I

Effect of the laser pulse shape on heating different material target configurations	7
I-1) Theory	7
I-1.1) Heating a semi-infinite target	7
I-1.2) Heating a thin film coated on a semi-infinite substrate	9
I-2) Computations and Discussions	14
I-2.1) Case of heating a semi-infinite <i>Al</i> -target	16
I-2.2) Case of heating an <i>Al</i> -film coated on a semi-infinite glass substrate	32
I-3) Conclusions	39
I-4) Appendix (I)	41
I-4.1) Case of heating a semi-infinite target	41
I-4.2) Case of heating a thin film coated on a semi-infinite substrate	44

CHAPTER II

Melting of a film coated on a semi-infinite substrate induced by a laser pulse	52
II-1) Theory	52
II-1.1) The time interval between initiating the melting process and full liquidification of the film	53
II-1.2) The time interval between full liquidification of the film and initiating the evaporation process	59
II-2) Computations and Discussions	66
II-2.1) The time interval between switching on the laser pulse and initiating the melting process	66
II-2.2) The time interval between initiating the melting process and full liquidification of the film	70
II-2.3) The time interval after full liquidification of the film	72
II-3) Appendix (II)	78
II-3.1) The time interval between initiating the melting process and full liquidification of the film	78
II-3.2) The time interval after full liquidification of the film	84
References	92
Arabic Summary	-