

Contents

Acronyms	9
Symbols	11
Chapter 1	
Introduction	13
Chapter 2	
Light transport in turbid media	15
2.1 From Maxwell's equations to Radiative transfer	16
2.2 From Radiative transfer to Diffusion	31
Chapter 3	
Spatially resolved time-of-flight spectroscopy	49
3.1 Optical characterization of turbid media	49
3.2 Cross-correlation optical gating	52
3.3 Ultrafast imaging	59
Chapter 4	
Experimental results	63
4.1 Validation of the technique	63
4.2 Unveiling data evaluation artifacts	67
4.3 A novel transport regime in ultra-thin samples	73
Chapter 5	
Space-time characterization of the ballistic-to-diffusive transition	81
5.1 Inverting light transport in a scattering slab	81
5.2 MCPLUSPLUS: a scriptable Monte Carlo library for radiative transfer	83
5.3 Deconstructing light transport at the ballistic-to-diffusive transition	87
5.4 Monte Carlo lookup-table based on spatio-temporal descriptors	93
Chapter 6	
Asymptotic transport in bounded media	99
6.1 Diffusive light transport in a semitransparent slab	99
6.2 Effective random-walk statistics	102
6.3 A walk on the wild side of diffusion	106
Bibliography	117
A Derivations	133
B Large-scale generation of exponentially distributed random numbers	141