

MEMOIRS

of the
American Mathematical Society

Number 1036

Uni Göttingen 7
231 978 308



W2012 B728

Connes-Chern Character for Manifolds with Boundary and Eta Cochains

Matthias Lesch
Henri Moscovici
Markus J. Pflaum



November 2012 • Volume 220 • Number 1036 (end of volume) • ISSN 0065-9266

American Mathematical Society
Providence, Rhode Island

Contents

List of Figures	vii
Introduction	1
Chapter 1. Preliminaries	9
1.1. The general setup	9
1.2. Relative cyclic cohomology	10
1.3. The Chern character	12
1.4. Dirac operators and q -graded Clifford modules	13
1.5. The relative Connes–Chern character of a Dirac operator over a manifold with boundary	15
1.6. Exact b -metrics and b -functions on cylinders	17
1.7. Global symbol calculus for pseudodifferential operators	19
1.8. Classical b -pseudodifferential operators	20
1.9. Indicial family	24
Chapter 2. The b -Analogue of the Entire Chern Character	25
2.1. The b -trace	25
2.2. The relative McKean–Singer formula and the APS Index Theorem	28
2.3. A formula for the b -trace	30
2.4. b -Clifford modules and b -Dirac operators	33
2.5. The b -JLO cochain	35
2.6. Cocycle and transgression formulæ for the even/odd b -Chern character (without Clifford covariance)	36
2.7. Sketch of Proof of Theorem 2.11	39
Chapter 3. Heat Kernel and Resolvent Estimates	45
3.1. Basic resolvent and heat kernel estimates on general manifolds	45
3.2. Comparison results	52
3.3. Trace class estimates for the model heat kernel	55
3.4. Trace class estimates for the JLO integrand on manifolds with cylindrical ends	58
3.5. Estimates for b -traces	59
3.6. Estimates for the components of the entire b -Chern character	60
Chapter 4. The Main Results	65
4.1. Asymptotic b -heat expansions	65
4.2. The Connes–Chern character of the relative Dirac class	69
4.3. Relative pairing formulæ and geometric consequences	75
4.4. Relation with the generalized APS pairing	82

Bibliography	85
Subject Index	89
Notation Index	91