Contents

Introduction	iii
Chapter 1. Preliminaries and notation	1
Chapter 2. Ambiguity function and Wigner distribution	3
2.1. Preliminaries	3
2.2. The ambiguity function on locally compact abelian groups	5
2.2.1. Definition and some basic facts	5
2.2.2. Behaviour at infinity	8
2.2.3. Square-integrability	10
2.2.4. Injectivity	19
2.3. The Wigner distribution on locally compact abelian groups	24
2.3.1. Definition and some basic facts	24
2.3.2. Behaviour at infinity	28
2.3.3. Square-integrability	31
2.3.4. Injectivity	33
$2.4. \widehat{A_{f,g}} = W_{f,g}$	35
2.5. Some examples	38
Chapter 3. The Zak transform	49
3.1. The abelian case	49
3.1.1. Definition and some properties	49
3.1.2. Zeros of the Zak transform	54
3.2. The non-abelian case	64
3.2.1. Definition and some properties	64
3.2.2. Some special cases	73
Chapter 4. Linear independence of generalized time-frequency shifts	83
4.1. Automorphisms of the Heisenberg group	83
4.2. Linear independence in the case $G = \mathbb{R}$	87
4.3. Linear independence in the case of a locally compact abelian group	96
4.3.1. Necessity of the condition	98
4.3.2. Sufficiency of the condition	102
Bibliography	113