GROUP THEORY AND QUANTUM TOMOGRAPHY

Abstract

A quantum system can be described using a C*–algebra approach where the observables of the system can be identified with the self–adjoint part of the algebra, and the states with normalized positive functional on such algebra. A tomographic picture of Quantum Mechanics is a theory that describes how to reconstruct a state of a quantum system from sampling functions that parametrize the state. It is natural to use unitary representations of certain groups to obtain a tomographic picture of a quantum system because of Naimark's theorem and the GNS construction. Thus given a state ρ we will show how to obtain sampling functions $F_\rho(x)$ and probability distributions W_ρ associated to them, called quantum tomograms, that under certain conditions can actually be measured in a laboratory.