

This thesis investigates the properties of the spectrum of an operator defined by a density matrix in the context of quantum statistical physics. The focus is on the operator T_μ , given by

$$T_\mu = \int_{S_H} x \otimes x d\mu(x),$$

where μ is a probability measure on the unit sphere in a complex Hilbert space. The study demonstrates that T_μ is a positive nuclear operator with a trace of one. Two examples illustrate the operator's spectral properties under different measures. The thesis primarily covers known properties and examples involving nuclear operators.