

# Macro-objectivation of quantum theory, relying on thermodynamics

**Ludovico Lanz**

Department of Physics, University of Milan  
via Celoria 16, IT-20123 Milan, Italy  
`lanz@mi.infn.it`

## **Abstract**

Starting with thermodynamics of irreversible processes, as an objective phenomenological basis, providing state parameters, compatibility with quantum theory is discussed. It is shown that under suitable conditions a deterministic evolution of these state parameters is induced by quantum dynamics: in this way a new foundation is given to Zubarev's method of "non equilibrium statistical operator". Also the situation in which such deterministic evolution breaks down is envisaged and it is argued that in this case a stochastic generalisation of the description is called for: here the concept of microsystem arises in a natural way and quantum theory in the modern axiomatic form is set in evidence. Thus a rooting is found of the concept of microsystem inside both quantum field theory and an objective phenomenological context.