The Abdus Salam
International Centre for Theoretical Physics

United Nations Educational, Scientific and Cultural Organization
IAEA International Atomic Energy Agency

School on
NEW TRENDS IN QUANTUM DYNAMICS AND ENTANGLEMENT
14 - 18 February 2011

QUANTUM MEASURES FOR NON-MARKOVIANITY

2. Information Flow and Measures for Quantum Non-Markovianity

Heinz-Peter BREUER
Albert Ludwigs Universitaet Freiburg
Physikalisches Institut
D-790104 Freiburg, Germany

Abstract:

We construct a measure for the degree of non-Markovian behavior in open quantum systems. This measure is based on the trace distance between quantum states and can be interpreted in terms of the flow of information between the open system and its environment. The measure takes on nonzero values whenever there is a flow of information from the environment back to the open system, which expresses the presence of memory effects and thus represents the key feature of non-Markovian dynamics.