

**【Abstract of 2009 Grant – in – Aid for Scientific Research on Innovative Areas
(Research in a proposed research area)】**

Title of project	Quantum Cybernetics - interdisciplinary studies of quantum controls and developments toward quantum computing
Head Investigator Name	TSAI Jaw-Shen, Riken, Advanced Science Institute, Macroscopic Quantum Coherence Laboratory, Laboratory Head
Abstract of Research Project	In this project, quantum coherent control/preservation/transmission, and detection of quantum states in various physical systems are studied under a unified view. Multi-disciplinal investigations of quantum coherence in solid state systems such as superconducting circuit, semiconducting circuit, as well as microscopic systems involving such as molecule, atom/ion, and photon are carried out. Quantum cybernetics can be applied to information processing and expected to be able to realize a computing system having capability far exceeding the modern computers. In this project, quantum computing is marked as an important target. Quantum detectors exceeding “quantum limits”, on-demand single photon source, quantum clock synchronization and other application of quantum cybernetics will be pursued.
Term of Project: 2009–2013	