

# Future and Emerging Technologies Unit

Note Title

05-03-2008

## Types of projects

Coordination  
road map  
community ...

## Research Projects

### QUROPE

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EPA - Pilot

### Integrated Projects

8 ÷ 10 million €

3 Projects  
with 15 ÷ 25  
groups

### Smaller Targeted Projects

1 - 3 million €

≈ 10 ÷ 15  
projects  
with 5 ÷ 10  
groups

# FP6 Projects

Acronym	Title	Project aim
<b>EuroSQIP</b>	European Superconducting Quantum Information Processor	quantum registers comprising 3-5 superconducting qubits
<b>QAP</b>	Qubit Applications	small scale qubit applications
<b>SCALA</b>	SCAlable quantum computing with Light and Atoms	scalable quantum computer, by using individually controlled atoms, ions and photons
<b>ACDET</b>	Acoustoelectronic Single Photon Detector	single photon detector
<b>COVAQIAL</b>	Continuous Variable Quantum Information with Atoms and Light	quantum information processing involving continuous carriers.
<b>EQUIND</b>	Engineered Quantum Information in Nanostructured Diamond	scalable quantum logic elements using nanostructured diamond
<b>MICROTRAP</b>	Development of pan-European micro-trap technology capability for trapped ion quantum information science	micro-fabrication processes and techniques for segmented trap production.
<b>OLAQUI</b>	Optical Lattices and Quantum Information	qubits, quantum gates and, eventually, a quantum computer or simulator using ultracold atoms in optical lattices.
<b>QICS</b>	Foundational Structures for Quantum Information and Computation	key structural issues in Quantum Information and Computation.
<b>QUELE</b>	Quantum Computing with Trapped Electrons	scalable quantum computer using charged particles.
<b>RSFQUBIT</b>	RSFQ Control of Josephson Junctions Qubits	on-chip integration of RSFQ circuits and Qubits.

# Main achievements

Acronym	Main project achievements
<b>EuroSQIP</b>	Demonstration of a Josephson 2-qubit universal logic gate Controllable coupling between Josephson qubits Demonstration of quantum non-demolition readout
<b>QAP</b>	First teleportation of a quantum state of light to a macroscopic atomic ensemble Demonstration of very long coherence times of Nitrogen-vacancy defects in diamond Development of a new efficient quantum algorithm for the hidden subgroup problem Theoretical exploration of the concepts of conditional, mutual, and comutual quantum information
<b>SCALA</b>	Progress in ion trap quantum computing and entanglement-assisted metrology Quantum measurement on individual photons stored in a super-long-lived superconducting cavity Theoretical proposal for simulating strongly correlated quantum many-body systems First demonstration of movable dipole traps, which act as optical tweezers for single atoms
<b>ACDET</b>	Demonstration of photon collection efficiencies exceeding 90% with AlGaAs multilayer structures Fabrication of a prototype acoustoelectric single-photon detector
<b>COVAQIAL</b>	First experimental demonstration of a quantum memory for light First generation of a Schrödinger kitten state of traveling light
<b>MICROTRAP</b>	Specification of fabrication techniques for multi-segment ion chip traps: laser-machined, monolithic Microtrap simulation and design optimization
<b>OLAQUI</b>	Detection of single atoms from a Bose-Einstein condensate loaded into an optical lattice Identification of novel coupling mechanisms between heteronuclear polar molecules in lattices
<b>QUELE</b>	Demonstration of electron trapping in planar Penning traps
<b>RSFQUBIT</b>	Development of a fabrication process for integration of RSFQ circuits and qubits Measurement of noise temperature of the RSFQ circuits compatible with single-shot flux readout

# Participants by Country / Funding level

