

Research Proposal

Research area	Quantum information/metrology using defect qubits in diamond
Research title	Development of quantum technology using defect qubits in diamond
Research keywords	Quantum processor, quantum sensing, quantum machine learning, 2D/3D spin dynamics

- *Research period : 2024.03 – 2025.03 (can be extended)*

- ***Research contents :***

Solid-state embedded defect qubits represent a promising quantum platform that operates at room temperature and atmospheric pressure. We employ advanced quantum engineering techniques to harness the potential of solid-state defect qubits for a wide range of quantum technologies, from quantum sensing to quantum information science.

At KIST CQI (center for quantum information), we actively seek for highly motivated Post-Docs/Research Interns to join our research projects (see below), and provide opportunities to be sent to global leading groups in quantum field (Univ of Chicago, UIUC etc).

1. Study of basic quantum science of strongly interacting spin qubit ensemble using scalable solid-state qubit devices

- Engineering scalable solid-state defect qubit ensemble devices for quantum simulation experiments
- Basic quantum information experiments using solid-state defect qubits

2. Study of Quantum Error Correction (QEC) algorithms using solid-state qubit system

- Basic experimental demonstration of QEC using solid-state defect qubits
- Investigation of new QEC algorithms using solid-state defect qubits

3. Quantum circuit optimization using machine learning algorithms

- Applying quantum machine learning algorithms for improved quantum metrology
- Developing quantum optimal control techniques using solid-state defect qubits

For further reads, please visit our lab homepage

<http://sites.google.com/view/pauligroup/home>

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