

R&D in quantum sensing, communications, and computing.

The quantum revolution is transforming the way we measure, communicate, and process information.

At Gradiant, we develop advanced solutions based on quantum principles to enhance the accuracy, security, and efficiency of next-generation technological systems.



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Quantum Technologies

by gradient 

Quantum Sensing and Metrology

Capabilities

- ✓ RF/MW/mm-wave quantum sensors based on Rydberg atomic systems.
- ✓ Quantum magnetometers and portable NMR [Nuclear Magnetic Resonance] systems [NV centers in diamond].
- ✓ RF analyzers using solid-state quantum devices.
- ✓ AI-assisted modeling and optimization of quantum sensors.
- ✓ Quantum sensors embedded in photonic integrated circuits [PICs]

Applications:

- ✓ Positioning, Navigation, and Timing [PNT].
- ✓ Spectral anomaly detection and quantum radar.
- ✓ Sub-THz quantum antennas.
- ✓ Biomedical diagnostics based on quantum NMR.
- ✓ Earth observation through quantum radiometry and magnetometry.



Quantum Communications

Capabilities

- ✓ End-to-end QKD subsystem engineering: emitters, detectors and processors
- ✓ Multiuser quantum networks with enhanced capabilities based on quantum memories and repeaters
- ✓ PIC integration of QKD subsystems [i.e. entangled photon sources]

Applications:

- ✓ Quantum-secured satellite communications
- ✓ Quantum encryption to enhance the security of classical networks [i.e. 5G networks]
- ✓ Quantum internet security



Quantum Computing

Hardware Capabilities:

Quantum control & enabling technology:

- ✓ Customized laser systems & stabilization techniques.
- ✓ QBit quantum control systems [RF + FGPA + AI].

Hardware Applications:

Quantum control of qubits for different physical platforms: neutral atoms, ions, nitrogen-vacancy [NV] centers, superconductors, etc.

Software Capabilities:

- ✓ Hybrid classical-quantum computing methodologies.
- ✓ AI-enabled error mitigation and correction on quantum platforms.

Software Applications:

- ✓ New material discovery [i.e. drugs, catalysers, etc].
- ✓ Optimization of telecommunication networks and resource management.

