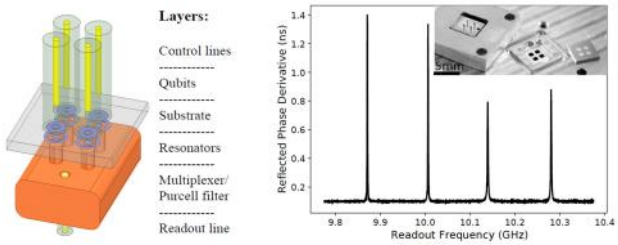
PROJECT NUMBER

20183

3-D integrated readout multiplexer and purcell filter for quantum computing

Microwave engineering concepts to provide high quality, low loss readout multiplexing and Purcell filtering of qubits in a single novel structure.
Circuit quantum electrodynamics (cQED) is a promising platform for quantum computing, enabling the preparation of stable quantum states with good lifetimes. Oxford have applied microwave engineering concepts to provide high quality, low loss readout multiplexing and Purcell filtering of qubits in a single novel structure.

Applications: Quantum Computing, Quantum Networks, Wireless Communication, Internet of Things



Features	Benefits
A novel off-chip structure for multiplexing signals from resonators of a circuit quantum electrodynamics device	Increases coupling rate between qubits
The structure uses a modular 3-D architecture without need for wire bonding	Significantly reduces the quantum processor wiring and peripheral hardware overheads
The device structure and the coupling to the resonators can be tuned to produce notch filtering at the qubit frequencies	Minimizes heat loads in the architecture

Features	Benefits
Readout resonators are coupled via pillars that are conductively shielded from each other	Scalable to large numbers of qubits
	Flexibility to add/swap multiplexer components
	Provides effective Purcell filtering at qubit frequencies, maintaining quantum coherence
	Demonstrated 0.5ms T1 for 16-way multiplexing
	Allows fast readout from multiple qubits while supressing cross-talk between resonators

Patented and Available for

- Co-development
- Consulting
- Licensing

To find out more, contact enquiries@innovation.ox.ac.uk and quote the project number.