



**Quantum
Computing &
Simulations**

Light Sources

QuEST

**Quantum
Communications**

**Foundations &
Quantum Theory**

**Sensors &
Navigators**

Key capabilities of the [Imperial College Centre of Excellence for Quantum Engineering, Science and Technology](#) (QuEST), directed by Professor Myungshik Kim

QUANTUM COMPUTING & SIMULATIONS

- Photonic quantum simulations** (Kolthammer/Kim/Walmsley)
- Quantum simulation for materials** (Berta/Kim/Knolle/Mintert)
- Photonic quantum computing** (Walmsley/Kolthammer)
- Quantum Monte Carlo simulations** (Foulkes)
- Single-electron and quantum dot devices** (Durrani)
- Quantum chemistry** (Klug/Bearpark)
- Mathematical models for biosystems** (Tanaka/Stan)
- Thin-film molecular semiconductors** (Heutz)
- Molecular quantum simulations** (Tarbutt)
- Ionic quantum simulations and gate operation** (Thompson/Mintert)

LIGHT SOURCES

- Quantum dot micropillars** (Oxborrow)
- Room-temperature Maser development** (Oxborrow/Alford/Breeze)
- Nanophotonics** (Oulton)
- Quantum optics** (Rudolph/Knight/Hess/Mintert/Kim)
- Laser development** (Damzen/Taylor)
- Single-photo light sources** (Kolthammer/Clark/Walmsley)

QUANTUM COMMUNICATIONS

- Wireless communication standards** (Clerckx)
- Post-quantum cryptography** (Ling)
- Random number generators** (Kolthammer)
- Quantum communication theory** (Berta)

SENSORS & NAVIGATORS

- Nanophotonics** (Maier/Oulton/Sapienza)
- Micro-Electro-Mechanical Systems (MEMS)** (Pike/Yeatman)
- Quantum optomechanics** (Vanner/Kim)
- Quantum sensors with diamonds** (Alfred/Oxborrow)
- Atomic quantum navigators** (Hinds)
- Seismometers** (Pike)

FOUNDATIONS & QUANTUM THEORY

- Quantum gravity and space-time** (Dowker)
- Foundations of quantum mechanics** (Rudolph)
- Quantum information theory** (Kim)
- Decoherence theory** (Lee)

