Molecular light management for energy

Using a range of different molecules to manipulate light for more efficient energy applications. Laboratories specialising in the characterisation and application of several molecular technologies. Leading expertise in spectral manipulation and exciton management using photochemical upconversion and singlet fission, and concentrating light using molecular luminescence.

More Information

Professor Timothy Schmidt and Professor Dane McCamey

ARC Centre of Excellence in Exciton Science, Schools of Chemistry and Physics

T: +61 (0) 439 386 109
E: timothy.schmidt@unsw.edu.au

UNSW Knowledge Exchange

knowledge.exchange@unsw.edu.au

www.capabilities.unsw.edu.au

+61 (2) 9385 5008

Competitive advantage

- Decade of experience and world leaders in photochemical upconversion
- Only laboratory using photochemical upconversion to convert light from below the silicon bandgap
- Can analyse energy flow across full spectrum, on all time-scales
- Access to unique singlet fission materials

Impact

- Upconversion and singlet fission can boost single threshold solar cells above 40% efficiency
- Luminescence solar concentration improves the performance of silicon solar cells in low light

Successful applications

- Seminal demonstrations of photochemical upconversion applied to solar energy
- Discovery of the molecular spin-quintet in singlet fission
- Luminescence solar concentration used to enable low-light photovoltaic applications

Capabilities and facilities

- Full range of optical and electrical characterisations facilities: ultrafast optical, THz and Raman, time-resolved electron spin resonance
- Material synthesis and fabrication of oxygen-sensitive devices

Our partners

- HiVis Pty Ltd – A manufacturer of road safety signs
- Through ACEx – CSIRO, RBA and DSTG