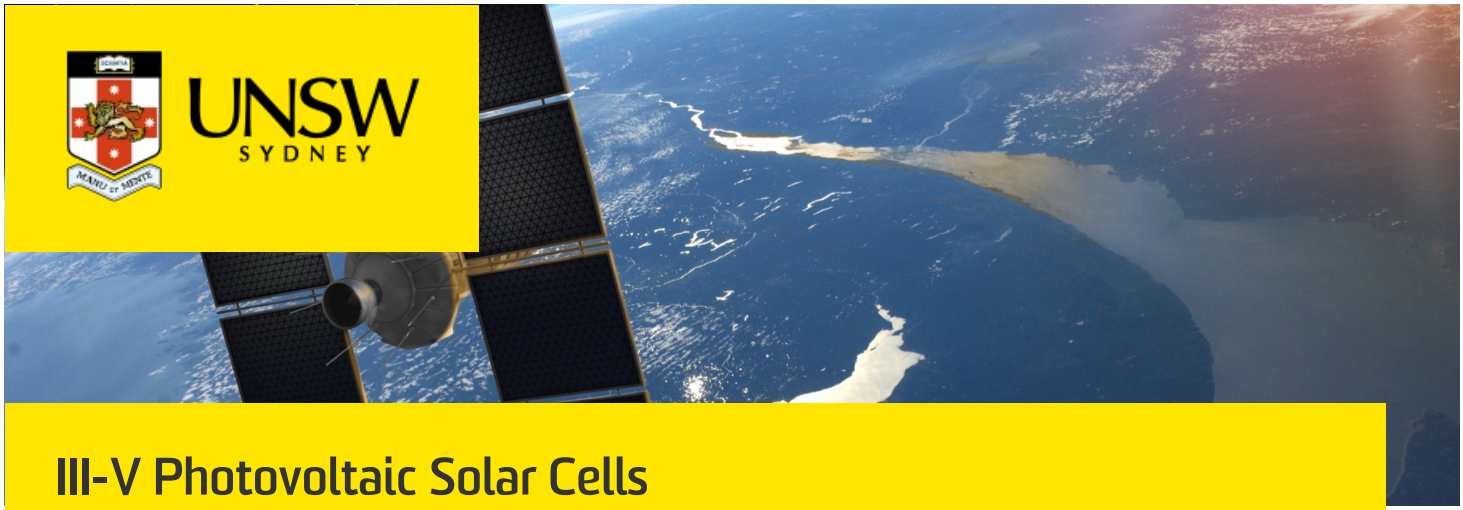

III-V Photovoltaic Solar Cells

Fabricating III-V PV solar cells—multi-junction solar cells made from III-V semiconductor alloys that are used in spacecraft and concentrator systems and are the most efficient available—from the epitaxial growth of high-quality III-V materials using molecular beam epitaxy to device processing and testing.

Competitive advantage

- Over twenty years' experience working on highly efficient III-V solar cells and associated photonic structures
- Only III-V molecular beam epitaxy capability in Australia with the rare ability to grow antimonide and bismide materials
- Full 3" III-V device growth, processing & characterisation on campus
- Rapid test and measurement capability, enabling IV, EQE and EL to be measured from 6" wafers automatically
- Experience in radiation testing of space solar cells

Impact

- Demonstrated the highest efficiency nanostructured solar cell ever made with a spin-out company, Quantasol, achieving 28.3% using strain-balanced quantum well layers. It is a technology that has since been evaluated by all major space solar cell manufacturers worldwide.

Successful applications

- Quantasol spin-out traversed the life-cycle from university lab to acquisition by JDSU (now Lumentum), a major optoelectronic device manufacturer
- Selective light confinement in multi-junction solar cells demonstrated in partnership with the US Naval Research laboratory

More Information

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Capabilities and facilities

- Gen930 molecular beam epitaxy system, consisting of 7 growth sources and three doping ports. This allows for the growth of Arsenides, Antimonides and Bismide compounds
- Access to full cleanroom for III-V device processing, photolithography, wet and dry etching and metallisation
- Full materials characterisation available including high-resolution X-ray diffraction, AFM, SEM, TEM, photoluminescence
- III-V photovoltaic characterisation available, including light I-V, suns-Voc, EQE and multi-junction EQE

Our partners

- IQE PLC

- US Airforce
- US Naval research laboratory