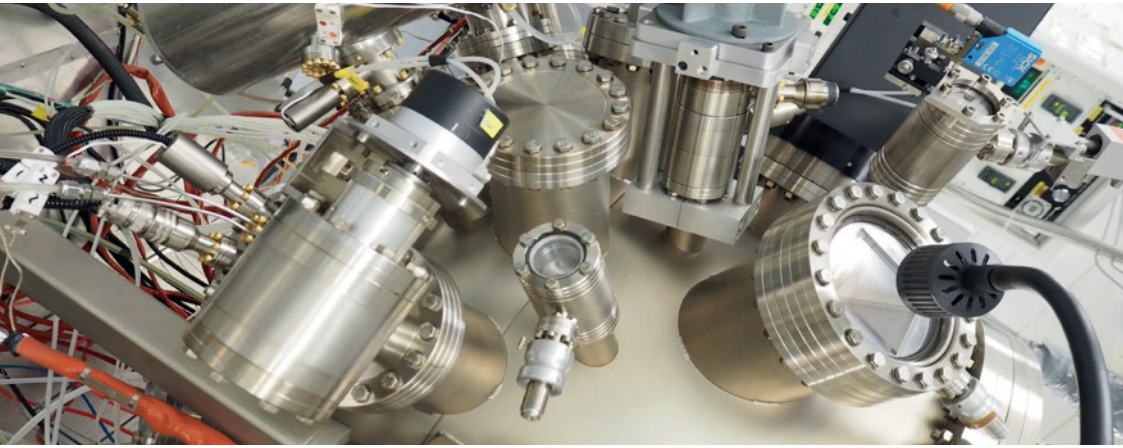
NATIONAL EPITAXY FACILITY

EPSRC
Engineering and Physical Sciences Research Council

Universities of Sheffield Cambridge & University College London

National Epitaxy Facility Pump Priming Scheme



The National Epitaxy Facility operates a 'Pump-priming' scheme where a limited amount of wafer resource can be made available to researchers free of charge and without the need for a current EPSRC grant. The rationale for the scheme is to stimulate UK strategic activity in III-V and Group IV semiconductors with the expectation that the recipient will, within 6 months, write a full EPSRC proposal building on the results of the feasibility study.

Potential users of this scheme should contact the facility via email through Angela Warren email: epitaxyfacility@sheffield.ac.uk and they will be placed in contact with a relevant member of the National Epitaxy Facility growth team to discuss their technical requirements and to advise on feasibility.

Users should then submit a completed proforma outlining the strategic need for the work, the principle(s) to be demonstrated, the resources required, the time-scales involved and a statement indicating how a full EPSRC proposal should result from the successful conclusion of the short study/ demonstration.

Each request will be considered for approval by the National Epitaxy Facility Pump Priming Committee with the selection of projects based on scientific quality, strategic need, and the Facility capability.

The scheme is open to all persons who normally qualify to hold an EPSRC grant.

Please visit our Pump Priming application process for further details: www.nationalepitaxyfacility.co.uk/about-us/pump-priming/

The Facility Location:
Centre for Nanoscience and Technology.
The University of Sheffield, North Campus,
Broad Lane, Sheffield, S3 7HQ
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"Back in 2012 we had an EPSRC-funded project at the University of Essex on spin-polarised VCSELs which was producing some very interesting results, using high-quality VCSEL wafers with GaInNAs quantum well (QW) active layers grown at Tampere University of Technology in Finland. Moreover, in a previous EPSRC-funded project at Essex we had also developed a theoretical model that suggested it would be advantageous to utilise quantum dot (QD) active layers in a spin-VCSEL; however, we did not have any funding to pursue this experimentally. Hence we approached the National Epitaxial Facility in the person of Dr. Ed Clarke, whom we knew could grow very high-quality dot-in-a-well layers, and he introduced us to the pump-priming scheme as a means of accessing this new technology. We discussed our requirements with Ed and together we identified a vertical external surface-emitting laser (VECSEL) design which might work. We applied via the pump-priming process (which we found to be a simple and painless experience) and duly received two wafers, which on testing were found to be very good. This led to the demonstration first of a QD VECSEL emitting at 1300 nm, and subsequently the world's first spin-VECSEL at this wavelength, thus demonstrating the experimental feasibility of the approach and validating the promise found in theory. This proof-of-principle demonstration resulted in a number of publications and led to a new collaboration with the University of Bristol and a new EPSRC grant in this area: the SPIN-SPACE project."

Professors Ian Henning and Mike Adams, University of Essex

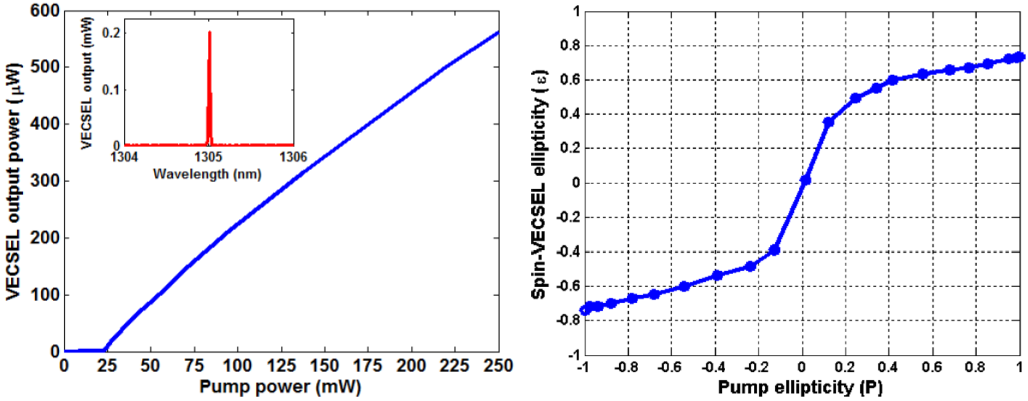

Figure: (left): Output vs. pump power for QD-VECSEL, with lasing spectrum inset, from [1], (right): output polarisation ellipticity as a function of pump ellipticity from QD spin-VECSEL, from [2].

1. S. S. Alharthi, E. Clarke, I. D. Henning, M. J. Adams, IEEE Photon. Technol. Lett. **27**(14), 1489 (2015)
2. S. S. Alharthi, J. Orchard, E. Clarke, I. D. Henning, M. J. Adams, Appl. Phys. Lett. **107**, 151109 (2015)

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