

EPSRC

Engineering and Physical Sciences
Research Council

UNIVERSITY OF
Southampton

Optoelectronics
Research Centre

**Projects and Partners -
Working with Chalcogenide Advanced
Manufacturing Partnership (ChAMP)**



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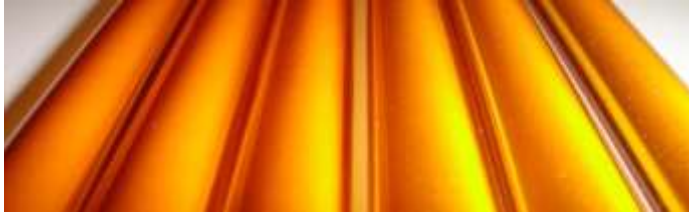
March 2015

ChAMP Aims

- Establish world leading chalcogenide research and manufacturing facility
- Discover new & optimise existing compositions
- Nurture links to **UK industry** to accelerate exploitation
- Develop demonstrators in key applications
 - Partner with academia and industry beyond founding partners to explore new applications
- Builds on 20 years of work on Chalcogenide materials
 - Significant material purity advances within the EPSRC Centre for Innovative Manufacturing in Photonics.



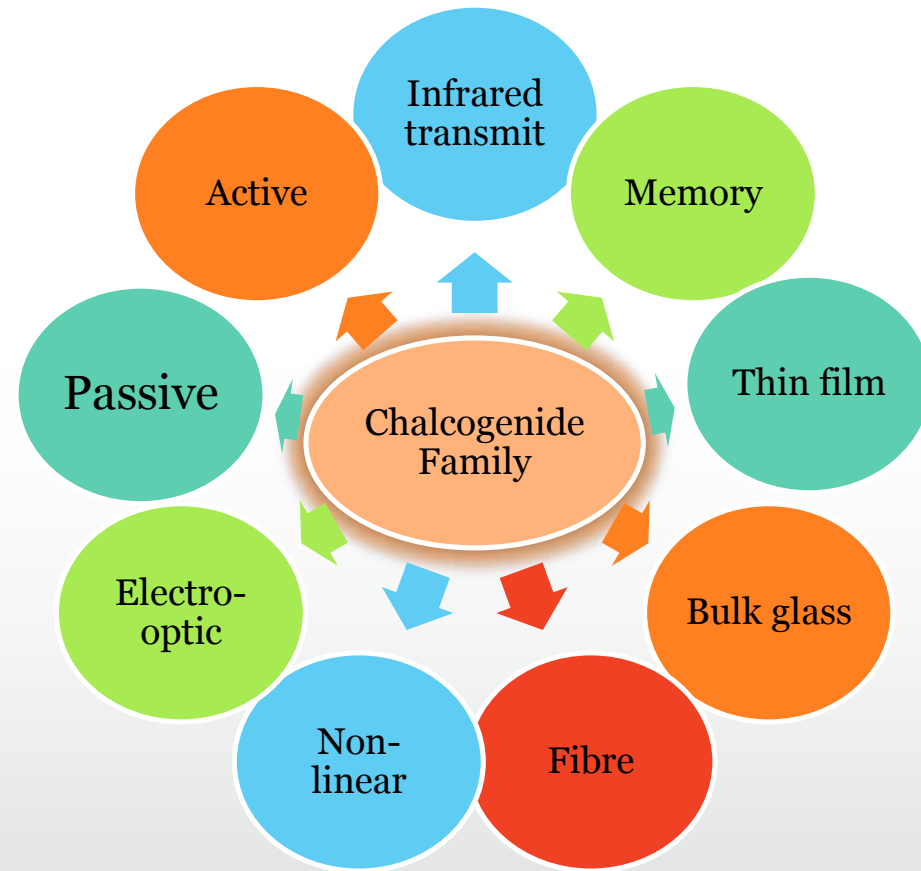
One material many properties



‘It’s beauty is in eye of beholder’

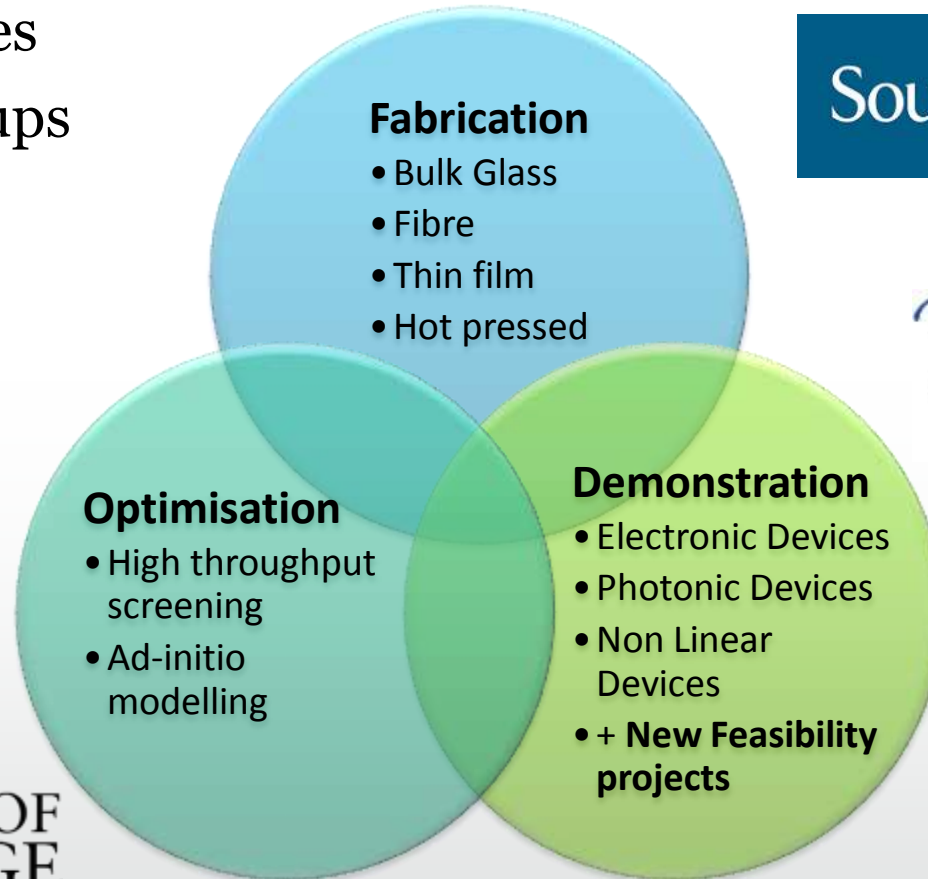
Aim of ChAMP is to

**Move next generation
Chalcogenides into real
applications no matter the
application**



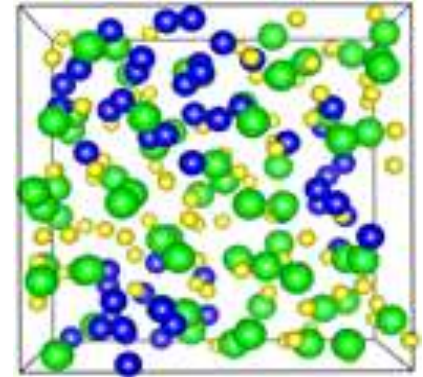
Coordinated program

- 8 work packages
- 6 research groups
- 5 Universities



Optimisation

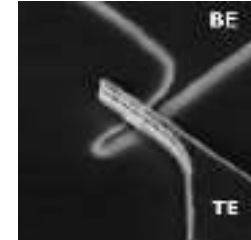
- **Ab-initio molecular dynamic simulation**
 - Prof Stephen Elliot, Cambridge
 - Design in the properties you need before you make material
- **Material optimisation & high throughput screening**
 - Advanced composite material facility
 - Prof. Brian Hayden, Southampton
 - Rapid deposition of 100's compositional variations to screen material candidates e.g phase change memory.
 - Confidence material is the best for the application.



Demonstrators

Electronic Devices - Prof David Wright, Exeter

- Wafer scale phase change memory



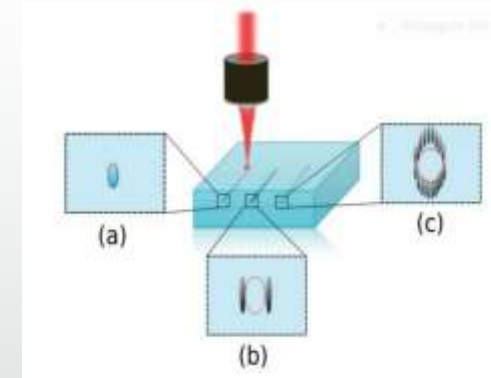
Photonic Devices Dr Harish Bhaskaran, Oxford

- Low power modulators & switches



Non Linear Devices - Prof Ajoy Kar, Heriot-Watt

- 3D waveguide and opto-fluidic fabrication
- Supercontinuum generation to $10\mu\text{m}$
- Modelocked lasers



Feasibility studies

- Short term industrial driven projects
 - Enable support for new applications emerging over 5 years of grant
- 20% of budget reserved for feasibility studies.
- Distributed via consensus from Champ Management committee
 - Majority co-funded with industry



Industry Engagement process

First contact

- Direct contact
- Workshops / events / outreach

Capability exploration

- Problem & capability discovery
- Match & fit with academic partner

Project proposals

- Iterate framework
 - Access to samples to bespoke development
 - PhD sponsorship to funded projected

Agreement in principle

- Detailed definition
 - goals, timescales, program, people

Legals

- Material transfer agreements
- IP by contribution, templates

Project start

- In-project feedback



Methods of engagement

Feasibility studies

- Rapid evaluations of near term impact

PhD sponsorship

- Understanding long term impact

Direct project support

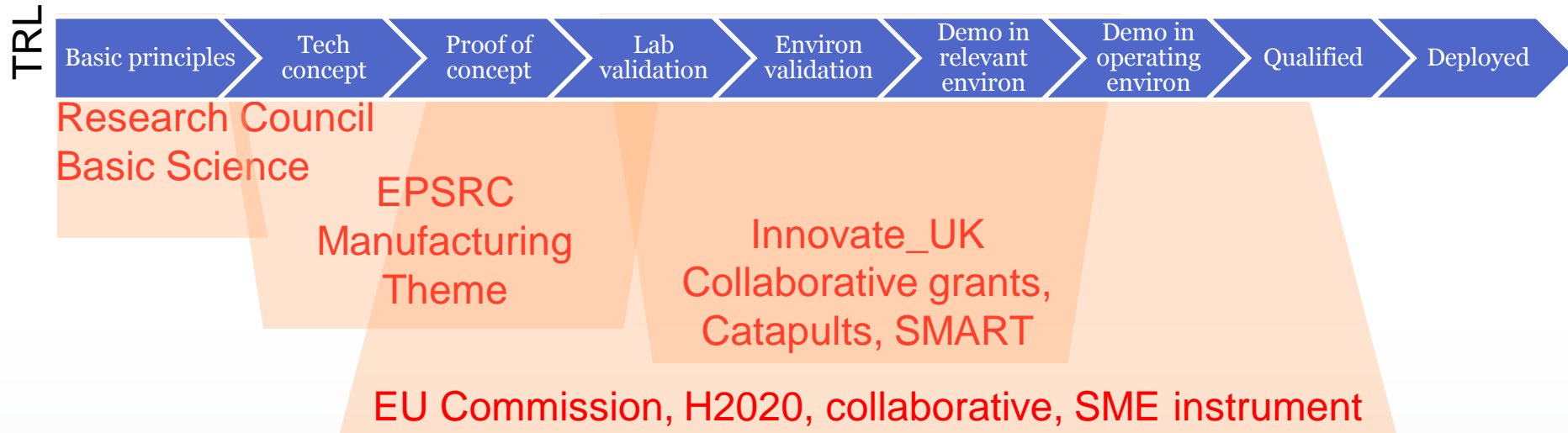
- Ownership of the outputs.

Samples

- Free to UK companies & academics for evaluation.



ChAMP part Manufacturing support Ecosystem



- ChAMP part of EPSRC **Manufacturing the Future** theme
 - Supporting research solving major manufacturing challenges
 - Beyond first observation how to make manufacturable
- Feeding higher TRL Development
 - Innovate, European commission & Company and exploitation



Future Photonics Manufacturing Research Hub

- EPSRC's Flagship 7 Year, £10 Million centres focused on solving fundamental manufacturing challenges.
- Future Photonics Manufacturing Research Hub =

Photonics Integration = Challenge for manufacturing

4 platforms

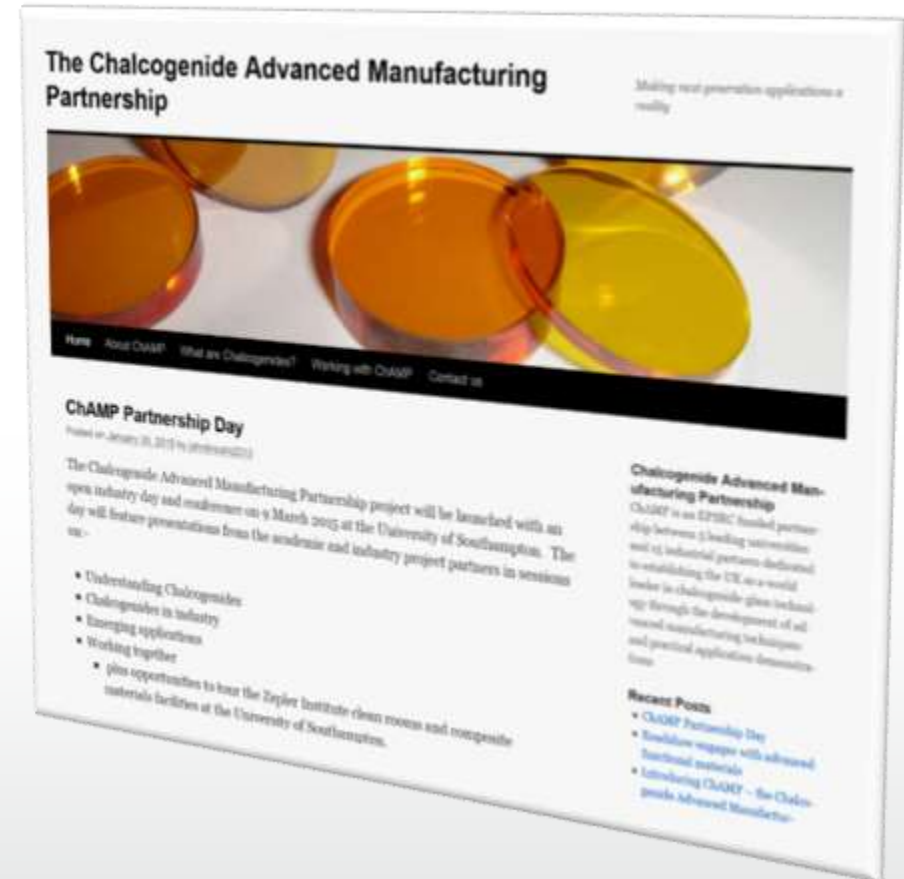
- High performance fibres- IR, UV, Blue, Power, Ultrafast
- Light Generation & Delivery – mid-IR III-V & Fibre
- Silicon photonics- integration & online test
- Large scale manufacture of meta & 2D materials & adv coatings
- Photonics passed 1st round with 9 others – 2 to be funded

**Your supported needed this week
to make reality**



Communication

- ChAMP blog / website
 - www.chalcogenide.net
- Twitter - @ChAMP_ORC
 - Growing central repository for Chalcogenide data and information
 - Updates on project and demonstrator progress.



Summary

Partnership is there to work with industry

- Contact us with your requirements and interests,
 - Samples existing glasses are available for evaluation at no cost
 - Access to high throughput screening to optimise & characterise material composition for application.
 - Demonstrators key element of project

Chalcogenides can be whatever you want them to be

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<http://chalcogenide.net>

