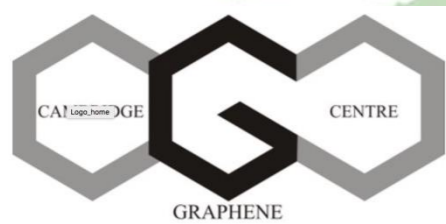


GRAPH-EYE

GRAPH-EYE CONSORTIUM



FORTH

INSTITUTE OF ELECTRONIC STRUCTURE AND LASER

Coordinator

GRAPH-EYE CONSORTIUM

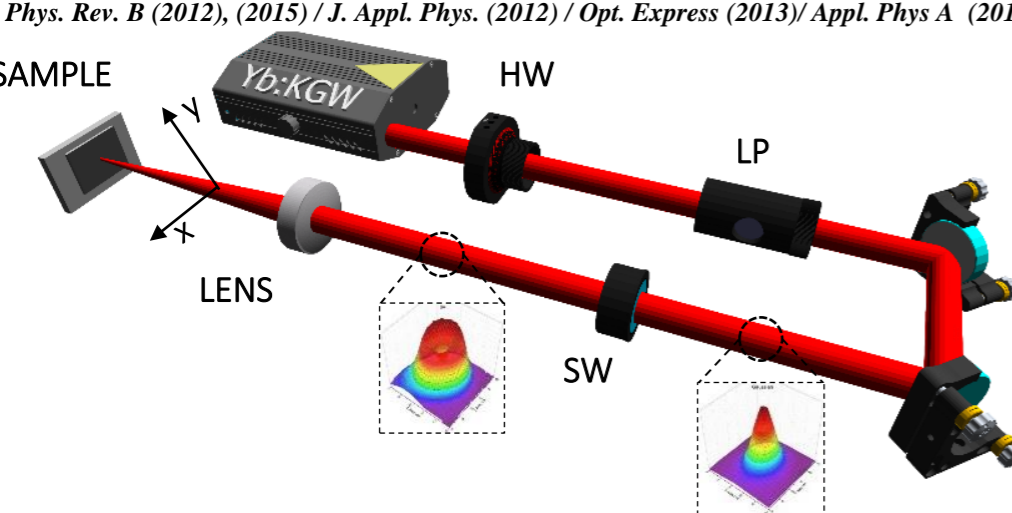
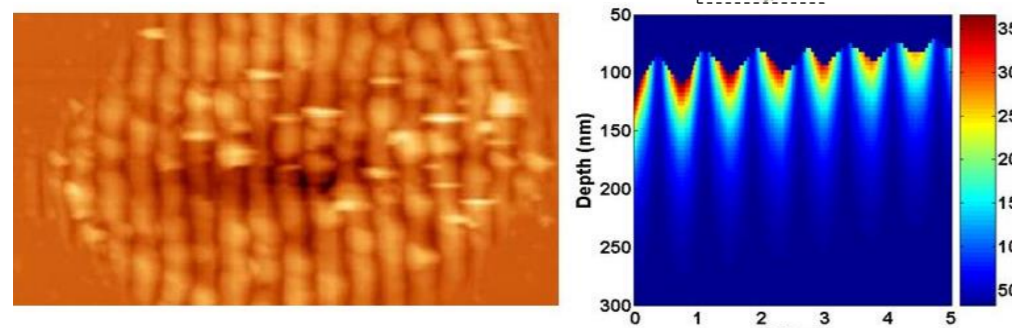
Partner Number	Country	Institution/Department	Name of the Principal Investigator (PI)	Name of the co-Investigators	Other participants
1 <i>Coordinator</i>	EL	FORTH	Dr. Emmanuel Stratakis	Prof. George Kioseoglou	Dr. Sotirios Psilodimitrakopoulos, Dr. Leonidas Mouchliadis, PhD Candidate Ioannis Paradisanos
2	BE	UA	Prof. Johan Verbeeck		Postdoc
3 <i>(Core Partner of Graphene Flagship)</i>	UK	UCAM	Prof. Andrea Ferrari		

Support Letters from **AIXTRON** and **NANOMEGAS SRPL**

Fundamentals of Ultrafast Laser Processing

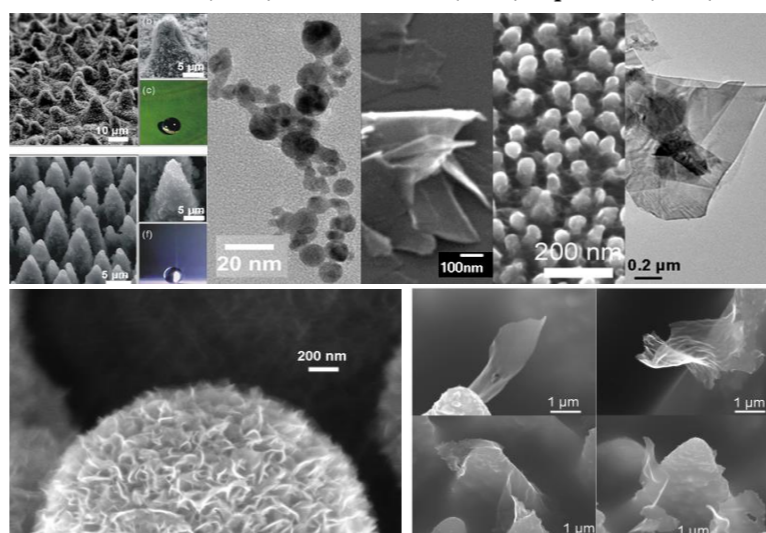
in collaboration with G. Tsibidis (IESL)

Phys. Rev. B (2012), (2015) / J. Appl. Phys. (2012) / Opt. Express (2013) / Appl. Phys A (2014)

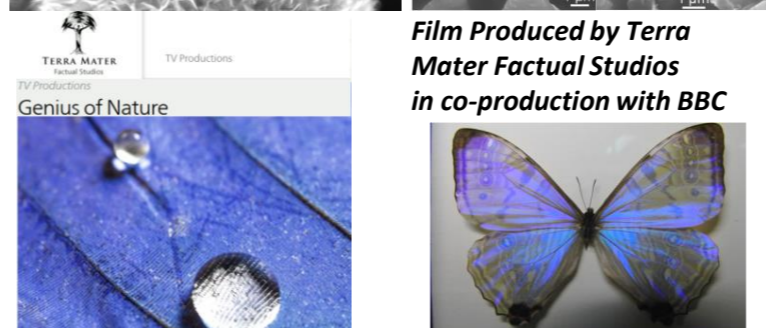



Biomimetic Micro/Nano Materials

Adv. Mater. (2008) / Sci. Adv. Mat (2012) / Opt. Lett. (2015)



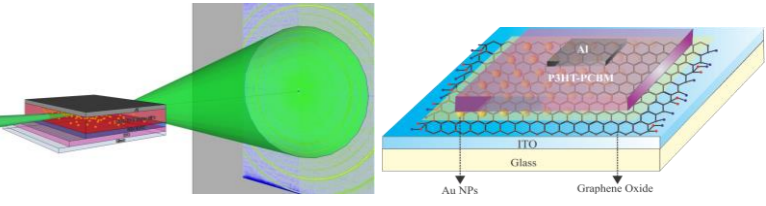
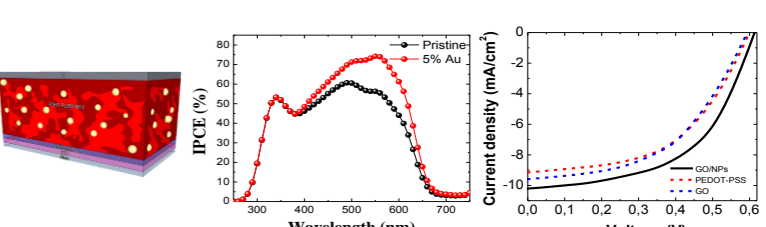
Film Produced by Terra Mater Factual Studios in co-production with BBC



Organic Photovoltaic Applications

in collaboration with E. Kymakis (TEIC)

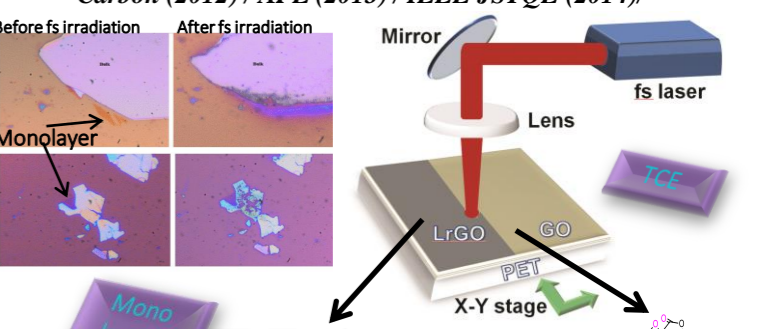
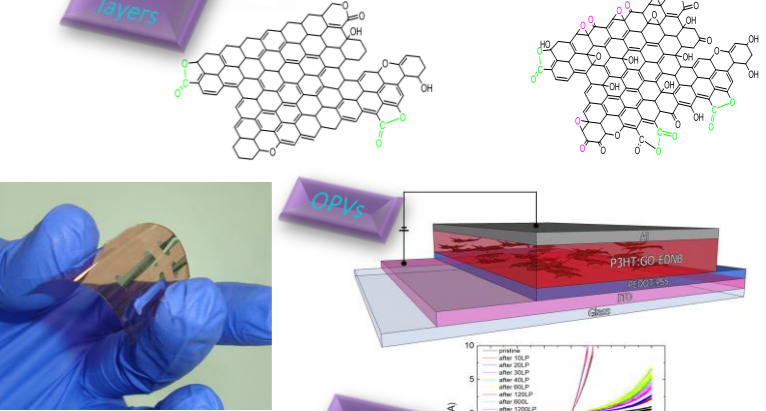
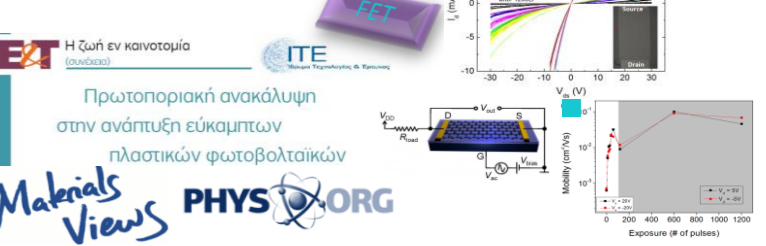
Adv. Ener. Mater. (2016) / Nanoscale (2014) / RSC Adv. (2013) / Mat. Today (2013) / Adv. Mater. (2013) / Chem. Comm. (2014)

Laser interaction with 2D materials

in collaboration with E. Kymakis (TEIC), T. D. Anthopoulos (ICL), G. Kioseoglou (IESL)

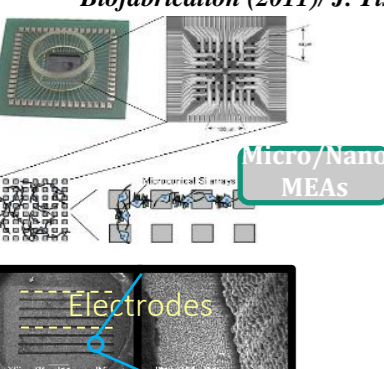
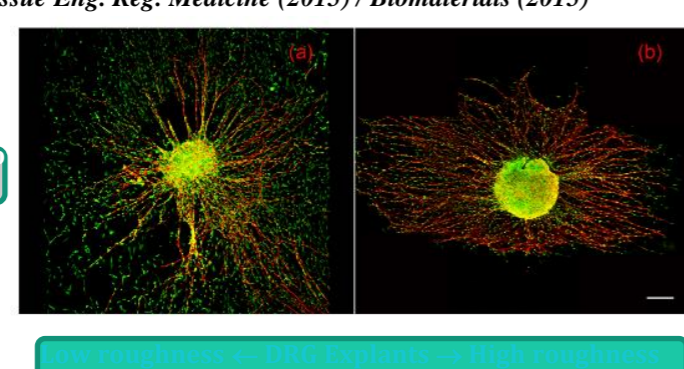
Adv. Func. Mater. (2013)(2015) / Nanoscale (2013) / Carbon (2012) / APL (2013) / IEEE JSTQE (2014) /

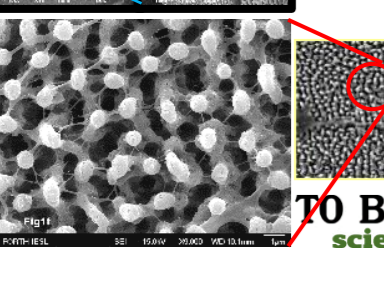
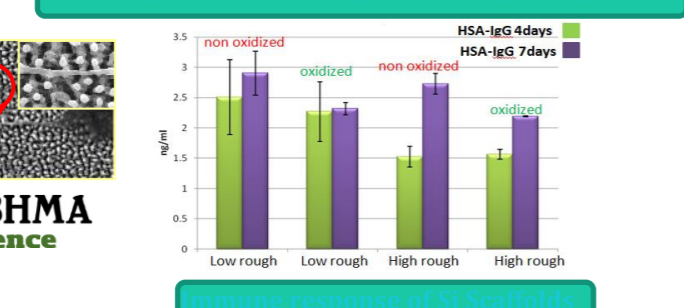
Biological Applications

in collaboration A. Ranella (IESL), I. Athanassakis (UoC) and A. Gravanis (IMBB)

Acta Biomaterialia (2010) / Tissue Eng. C (2009) / Biofabrication (2011) / J. Tissue Eng. Reg. Medicine (2015) / Biomaterials (2015)

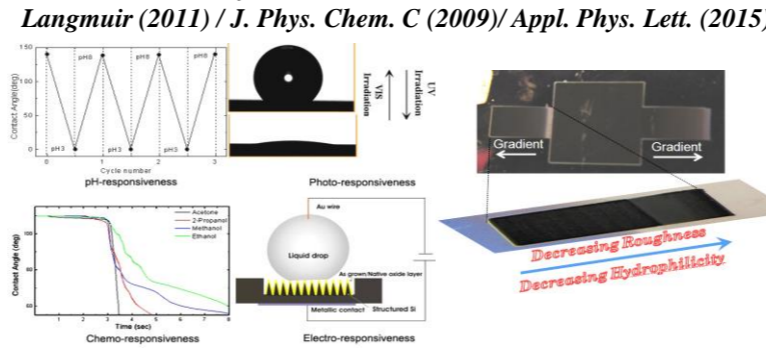
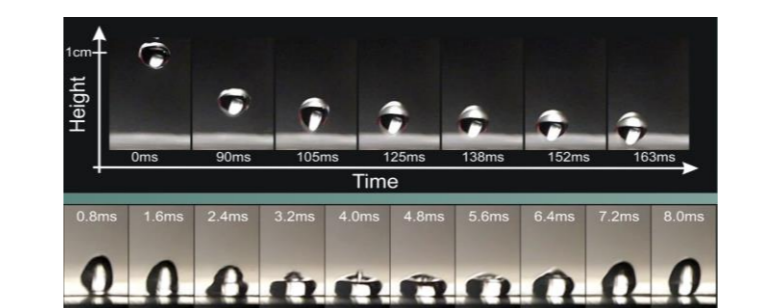
Low roughness ← DRG Explants → High roughness

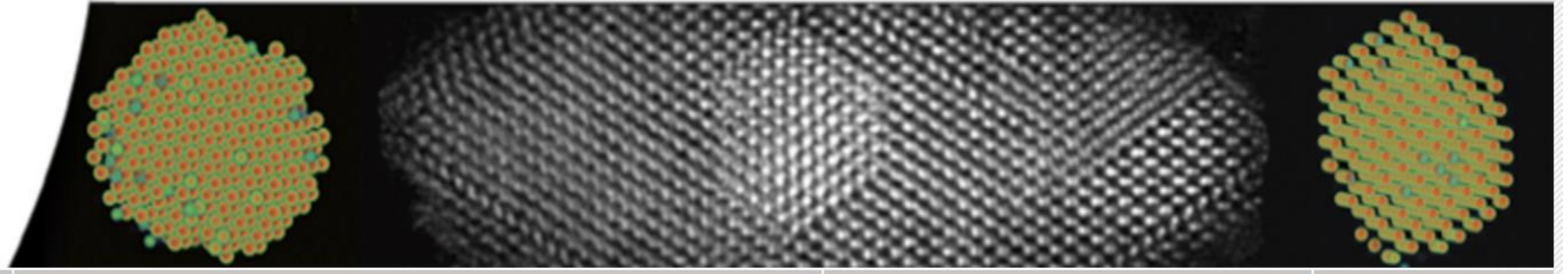



Extreme Wetting and Microfluidics

in collaboration with M. Vamvakaki and S. H. Anastasiadis (IESL)

Biomicrofluidics (2010) / Chem. Comm. (2010) / Langmuir (2011) / J. Phys. Chem. C (2009) / Appl. Phys. Lett. (2015)



Research Mission

EMAT is one of the leading electron microscopy centers in the world and has a vast expertise in both fundamental and applied electron microscopy. EMAT has several state of the art electron microscopes including two aberration corrected, high end FEI-Titan instruments, a dual beam FIB, an environmental SEM,..Analysis and management according to harmonized standards such as ISO14791 for medtech-products required.

Techniques

- Positioning atoms with picometer precision from high resolution images
- Detailed interpretation of EELS data
- Advanced EDX on low concentration impurities



Cambridge Graphene Centre

Research Centre on Graphene, Layered Crystals and Hybrid Nanomaterials

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Welcome to the Cambridge Graphene Centre

Tweets by @GrapheneCA

Graphene Centre Retweeted



Graphene Flagship

@GrapheneCA

#Science is about #curiosity
#inspiration! Embrace the w
#personality and background
work Catherine Boissier @
@AstraZeneca #womening
#InternationalWomensDay

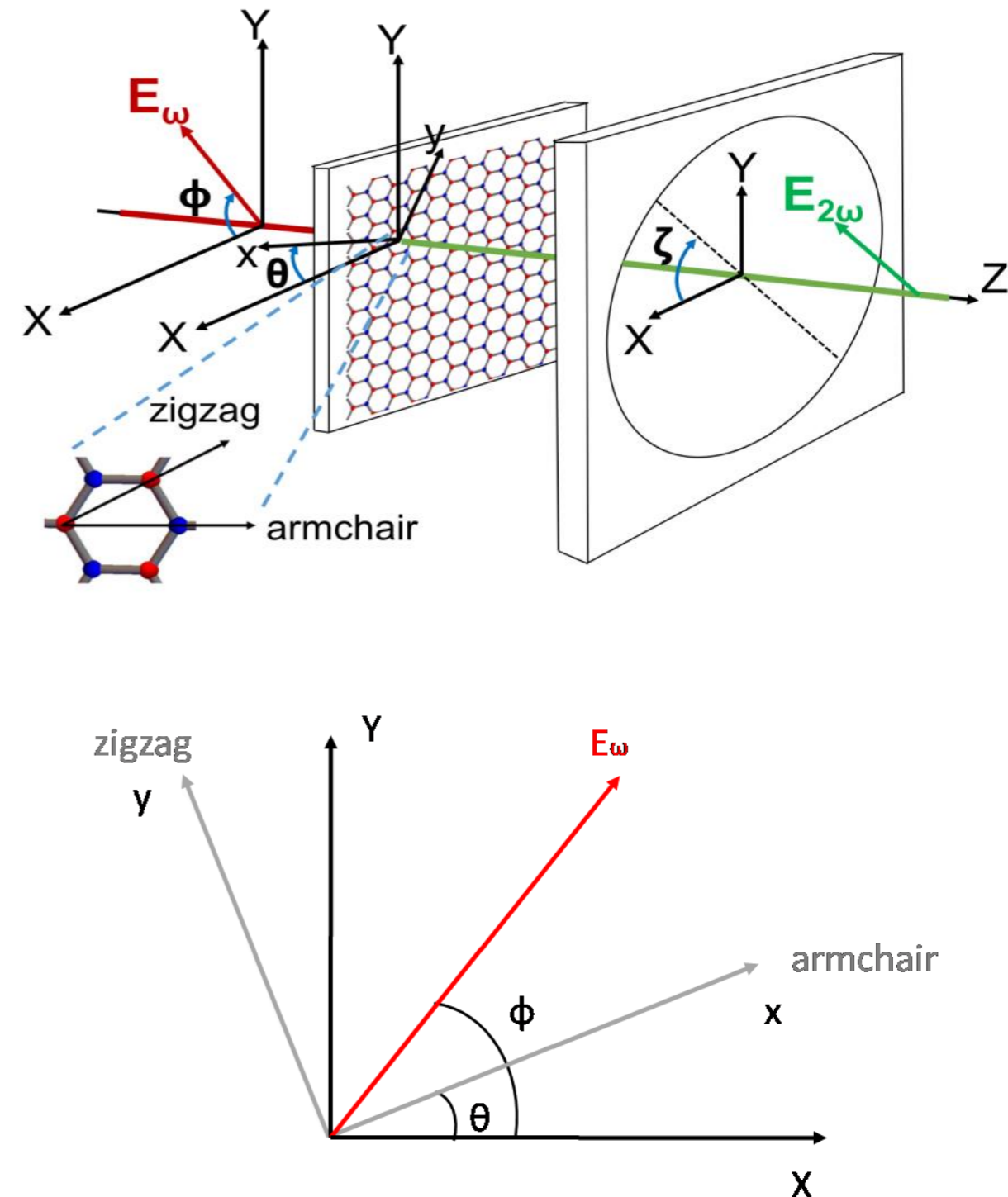
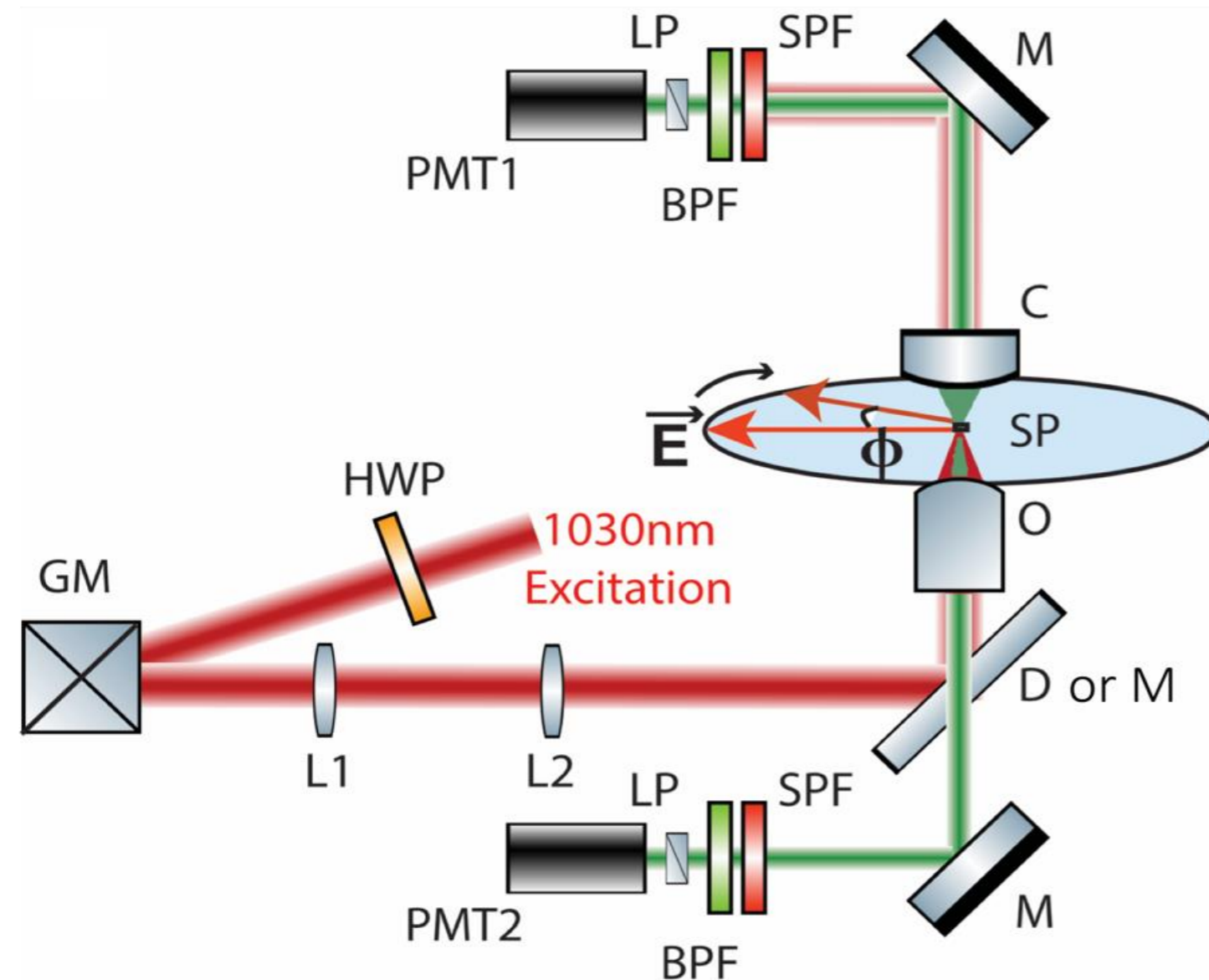


THE 'GRAPH-EYE' CONCEPT

All optical, high resolution, non-invasive, quality control of crystalline GRMs via imaging of their non-linear optical properties

- Development of **all-optical, fast and non-invasive tool** that will enable **high-throughput, accurate large-area characterization of GRMs' quality** for the efficient industrial-scale production of GRMs.
- The optical nature of the developed technique enables its **direct integration into CVD-growth chambers** for the **in-situ monitoring of the 2D crystals' quality during growth**.
 - **WP3** 'Enabling Materials,
 - **WP10** 'Production '

Polarised 2nd Harmonic Generation (PSHG)

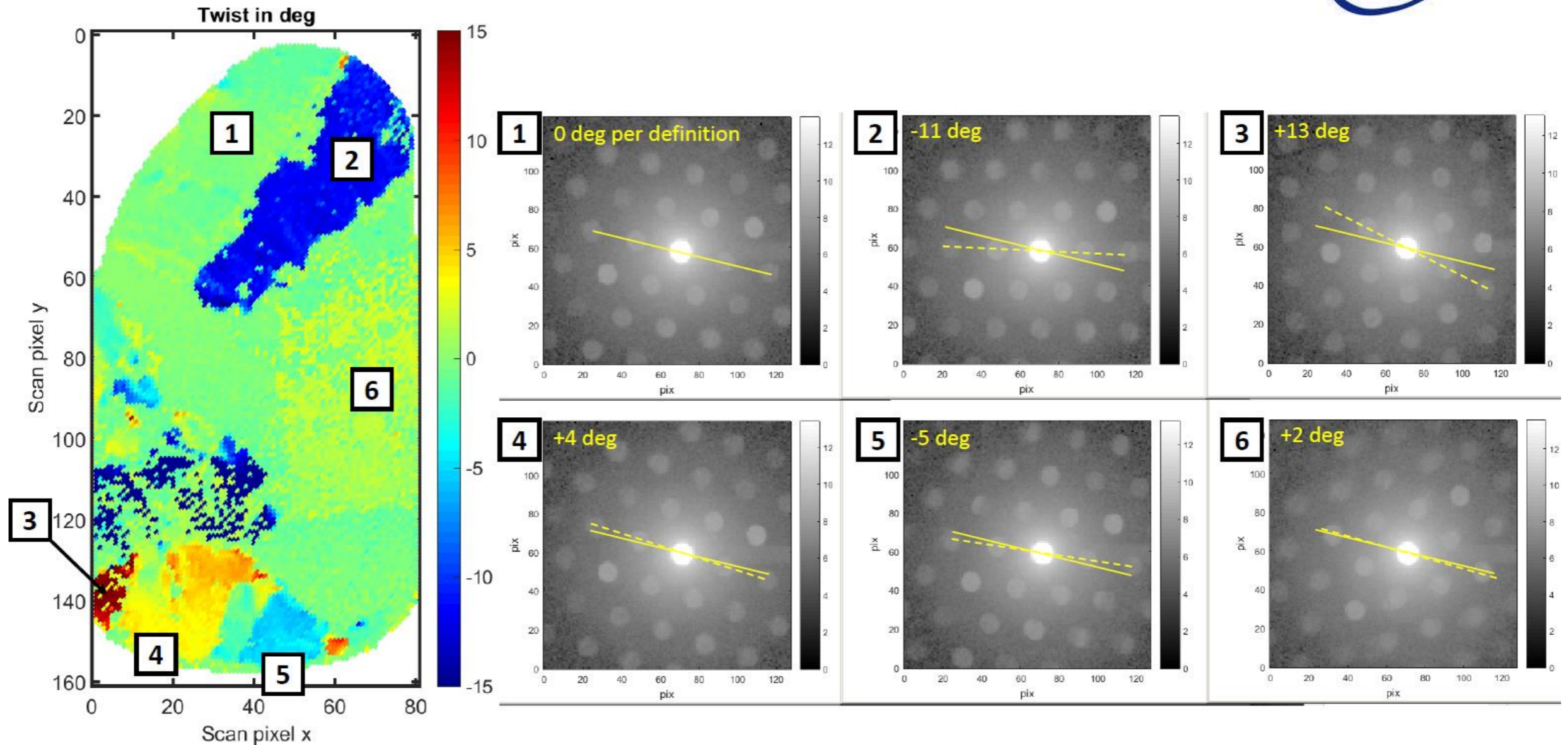


PSHG

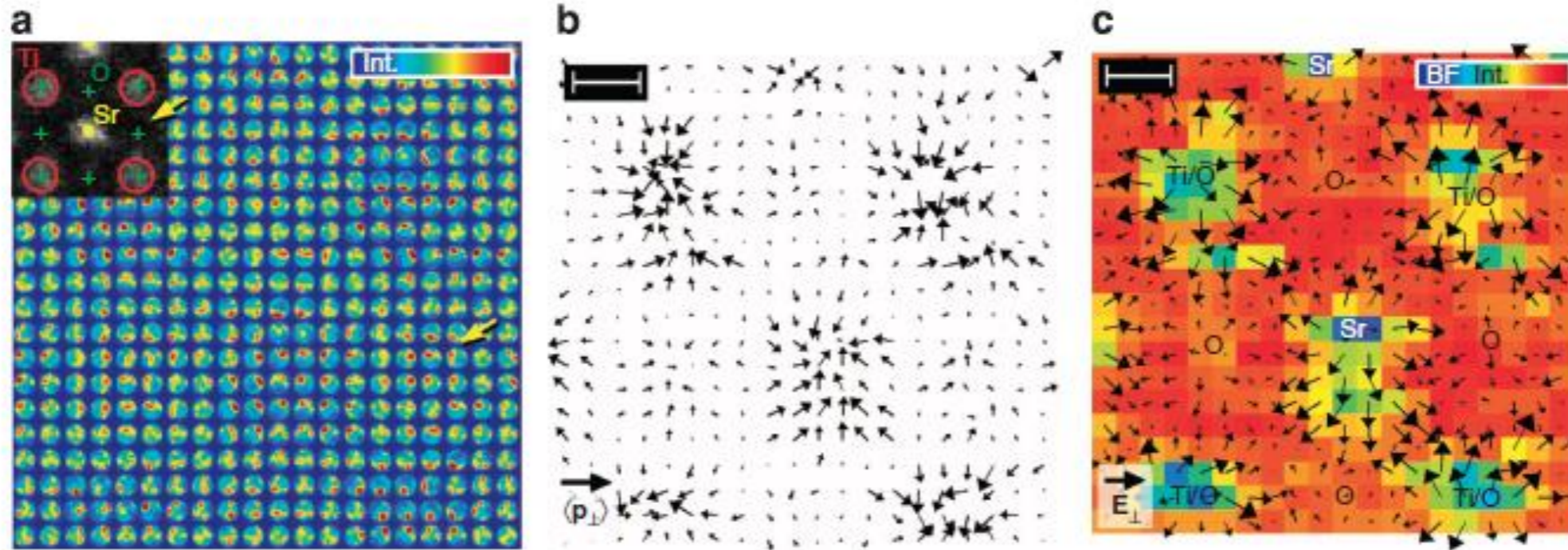


Crystal symmetry

MoS₂ grain orientation mapping

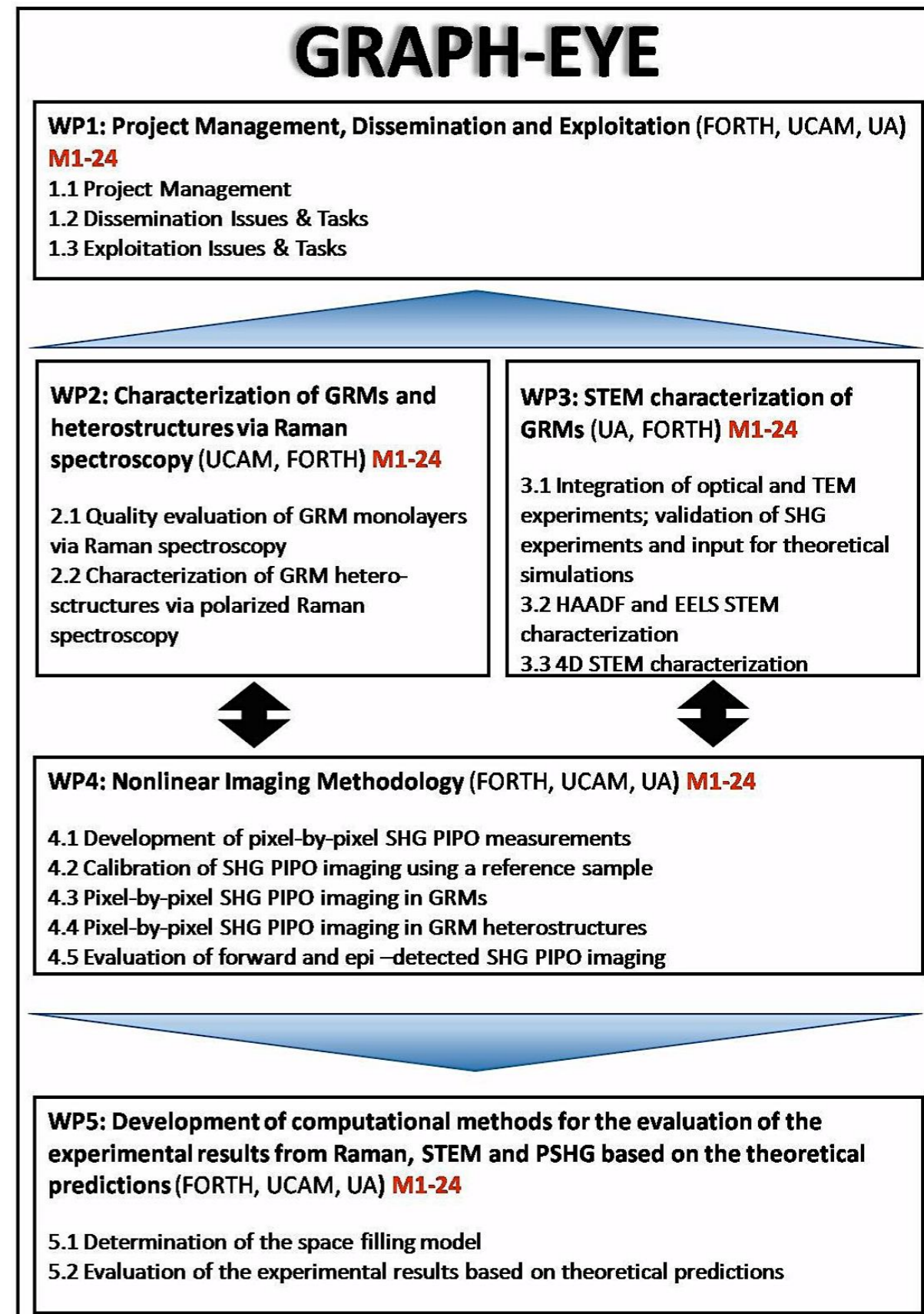


Record diffraction pattern for every image point
Data treatment reveals grain orientation (and strain)
Challenge: work on identical regions as for 2nd harmonic optical method
Goal: validate optical method with established TEM nanodiffraction



THE GRAPH-EYE STRUCTURE

Partner	Main Task
FORTH	Ion Pump Technology
UA-EMAT	Electron microscopy/spectroscopy
CGC	Raman Spectroscopy



GRAPH_EYE: CURRENT STATUS

- Submission and approval of Graphene Flagship Partnering Project Application
- Kick off meeting, Heraklion, Feb. 27