

THE GOALS



Demonstration of on-chip all optical quantum processing for secure quantum communication, quantum computing and quantum simulation.

2D-SIPCs breakthrough will be the development and prototyping of a full set of 2DM on-chip quantum components and the scalable integration of these into prototype IQNs.

Tuneable and entangled single photon generation

Broadband and high temperature single photon detection

1

2

3

4

Ultra-fast and non-linear single photon processing

Design and prototyping of novel 2DM platforms

THE PROJECT

2D-SIPC will develop scalable quantum networks, based on photonic chip integration of novel 2D material quantum devices, with the main goal to demonstrate all-optical on-chip quantum processing. The recent demonstration of effortless integration of 2D materials onto a CMOS compatible photonic platforms will result in a breakthrough in the development of on-chip quantum networks.

With this unique combination of features 2D-SIPC will allow the first demonstration of on-chip optical quantum processing, a key milestone for many quantum network concepts, such as extended secure quantum communication, scaling up of quantum computers and simulators, and novel quantum sensing applications with entangled photons.

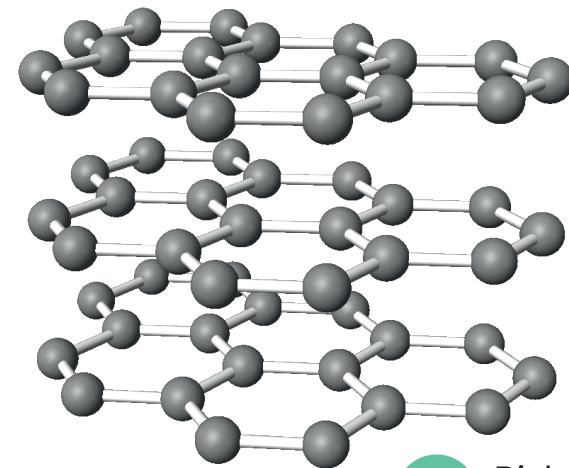
Beyond the 2D-SIPC platform, each developed component will be exploited in such distant fields as biological and medical imaging, radio-astronomy and environmental monitoring.



THE 2D MATERIALS

KEY ADVANTADGES

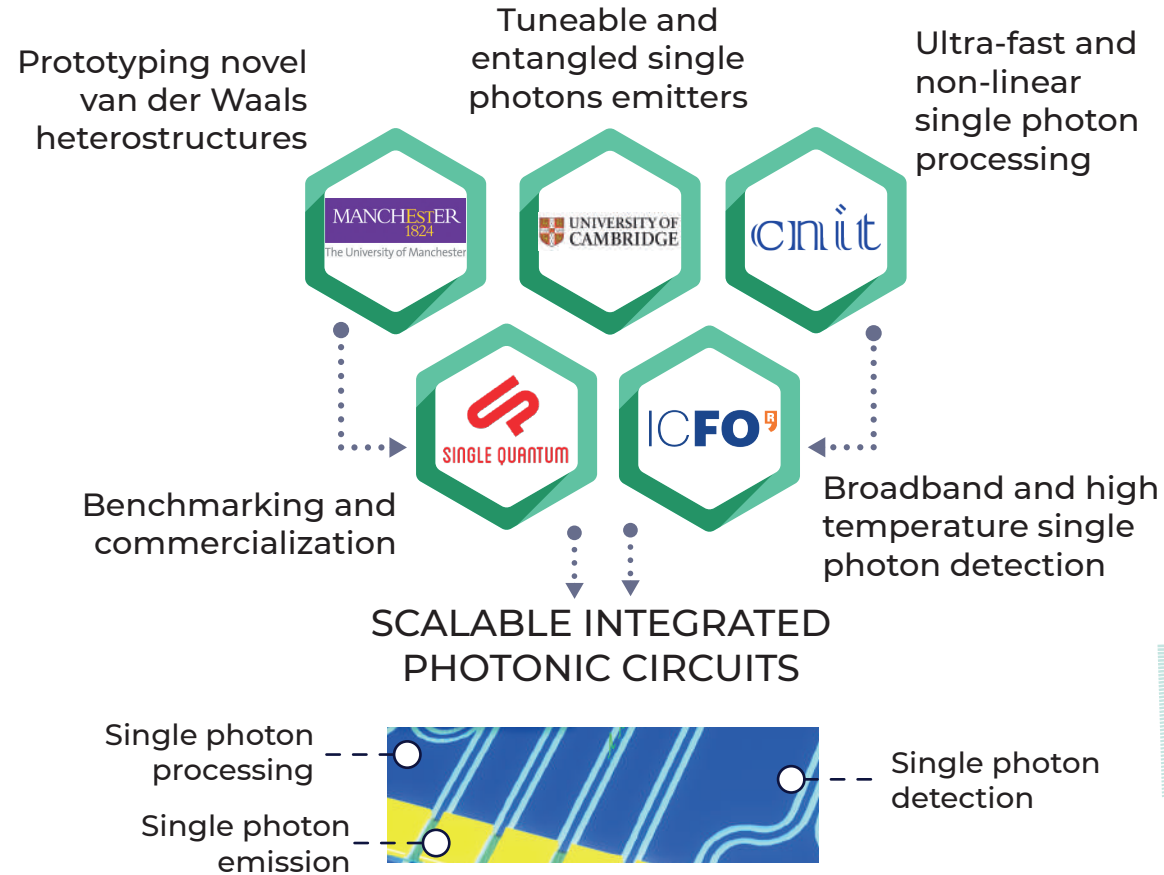
1 Easy to integrate into photonics chips



2 Mutual compatibility and scalability

3 Rich phase space of novel quantum opto-electronic properties

WORK PACKAGES



THE PARTNERS

2D·SIPC

- ICFO – The Institute of Photonic Science (Spain)
- National Graphene Institute, University of Manchester (UK)
- Cambridge Graphene Centre, University of Cambridge (UK)
- CNIT - Inter-University Consortium for Telecommunications (Italy)
- Single Quantum (Netherlands)



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TWO-DIMENSIONAL QUANTUM MATERIALS AND DEVICES FOR SCALABLE INTEGRATED PHOTONICS CIRCUITS

2D·SIPC



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