



PHASECRAFT

QAFA

Quantum Algorithms from
Foundations to Applications

UNLOCKING THE
POWER OF
QUANTUM COMPUTING
TO IMPROVE OUR WORLD

Phasecraft: the quantum algorithms company

Our goal: Get the most out of near-term quantum computers – taking research to reality, faster

Our published work includes...

- ⌘ The most efficient quantum algorithm + simulator for producing low-energy states of the Hubbard model
[PRB '20, Editor's Suggestion, [arXiv.org/1912.06007](https://arxiv.org/abs/1912.06007)]
- ⌘ The most efficient quantum algorithm by 5 orders of magnitude for modelling the time-evolution of the Hubbard model
[Nature Comms '21, [arXiv.org/2003.06886](https://arxiv.org/abs/2003.06886)]
- ⌘ The most efficient encoding of quantum materials / chemistry models into qubits
[PRB '21, [arXiv.org/2003.06939](https://arxiv.org/abs/2003.06939), [arXiv.org/2003.07125](https://arxiv.org/abs/2003.07125)]

The company:

- ⌘ Founded by Toby Cubitt, Ashley Montanaro and John Morton
- ⌘ Founders have >50 years combined experience in quantum computing
- ⌘ Funded by venture investment (Episode 1, LocalGlobe, Parkwalk, UCL Tech Fund)
- ⌘ Pre-seed funding 2019, seed round 2020
- ⌘ Team of 16 based in Bristol and London



QAFA: Quantum Algorithms from Foundations to Applications

Project goal: Address the most significant near-term and long-range theoretical challenges involved in applying quantum algorithms to practical problems, delivering e.g...

- ⌘ Fast quantum optimisation algorithms
- ⌘ Efficient quantum communication protocols
- ⌘ Efficient algorithms for simulating quantum systems

Project organisation

- ⌘ 2M euro budget over 5 years
- ⌘ Hosted at Phasecraft and University of Bristol (~50% each)
- ⌘ Phasecraft is responsible for the near-term, more applied aspects
- ⌘ University of Bristol is responsible for the longer-term, blue-sky aspects
- ⌘ Project has funds to support PI (Ashley Montanaro) and team of 2 at each host



Value of hosting an ERC grant

- *Project funding* (particularly valuable for an early-stage startup company)
- *Prestige* – highly sought-after grants, rare to be hosted at a company
- *Talent Attractor* for world-class staff, visitors and collaborators
- Enables the *freedom and flexibility* to work on “bluer-sky” research

All of these are particularly valuable as the project is strongly aligned with Phasecraft's R&D



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Phasecraft's R&D collaborations

Quantum hardware companies



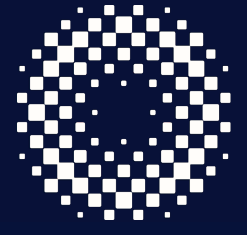
Academic



Industry (users)



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