

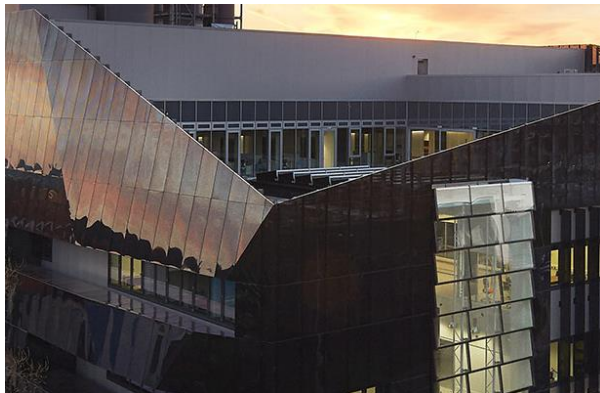
Physics & Astronomy

5th May 2026

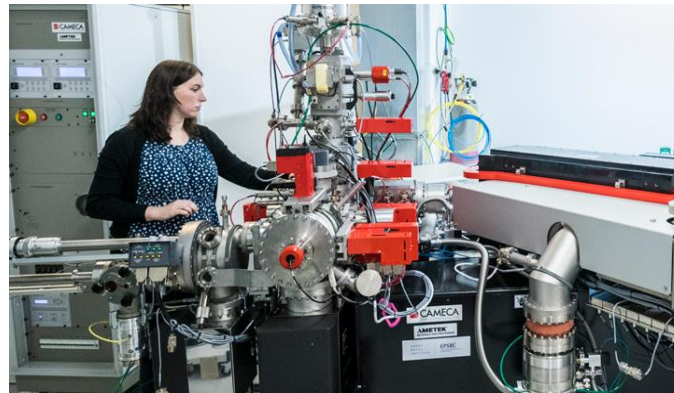
- Intro to department

Chris Parkes, Head of Department

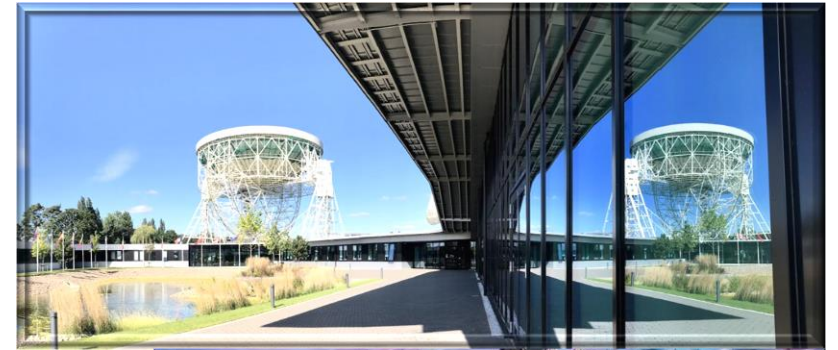
National Graphene
Institute



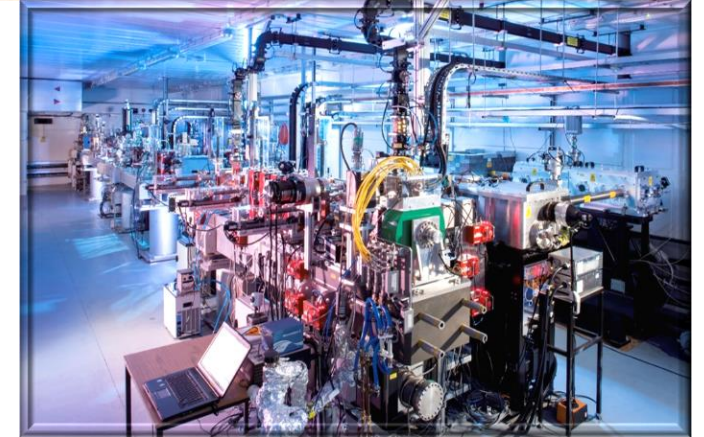
Photon Science
Institute



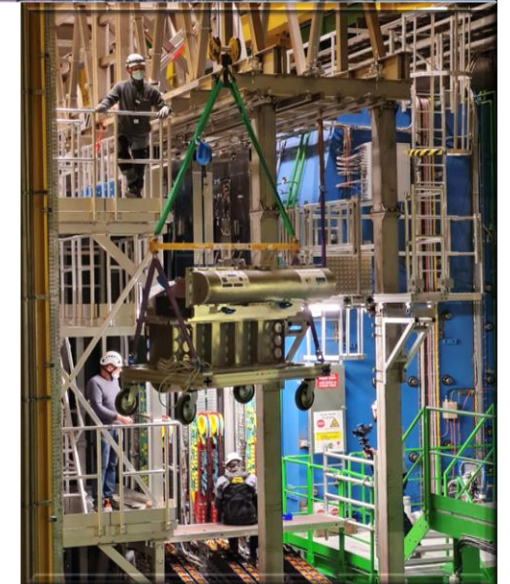
JBCA &
SKA HQ



Cockcroft Institute,
Daresbury



CERN
& LHC



Legacy

- Internationally recognized department with 150 year history
- One of the birthplaces of following fields:
 - **Nuclear Physics:** Discovery of nucleus, splitting of atom
 - **Quantum Physics:** Niels Bohr theory, dilution refrigerator
 - **Particle Physics:** First non-standard matter particle (Kaon)
 - **Radio Astronomy:** Jodrell Bank
 - **2D Materials:** Graphene
- In many cases our international leadership today can be traced to this lineage



- Large department with wide research portfolio
 - 113 academic staff + senior fellowships
 - ~215 grant supported staff
 - 324 PhD Students
- and largest undergrad. cohort in UK
 - 1173 undergraduates
 - 101 taught postgrad (Nuclear Technology)



2025 Global Ranking of Academic Subjects

Physics

9	The University of Manchester 📍 United Kingdom
10	University of Oxford 📍 United Kingdom
11	University of Cambridge 📍 United Kingdom

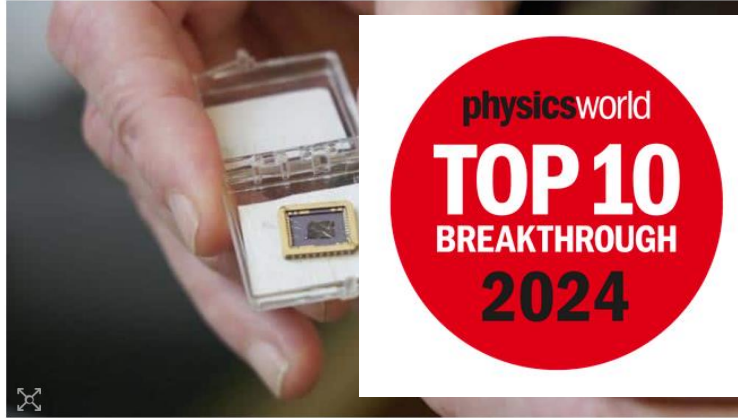
Research Groups today

- **Research Areas:** (% academics, <5% Teaching only)
- 39%: Particle Physics, Nuclear Physics, Accelerator Science
- 27%: Astrophysics (Cosmology, Extra-Galactic, Galactic, Pulsars...)
- 34%: Condensed Matter; Quantum Tech; Bio-physics; Fluids; Theory



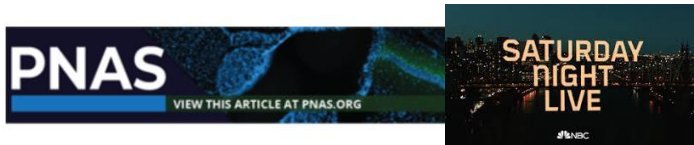
Some recent examples in media

A semiconductor and a novel switch made from graphene



Epigraphene on a chip: the team's graphene device was grown on a silicon carbide substrate. (Courtesy: Georgia Institute of Technology)

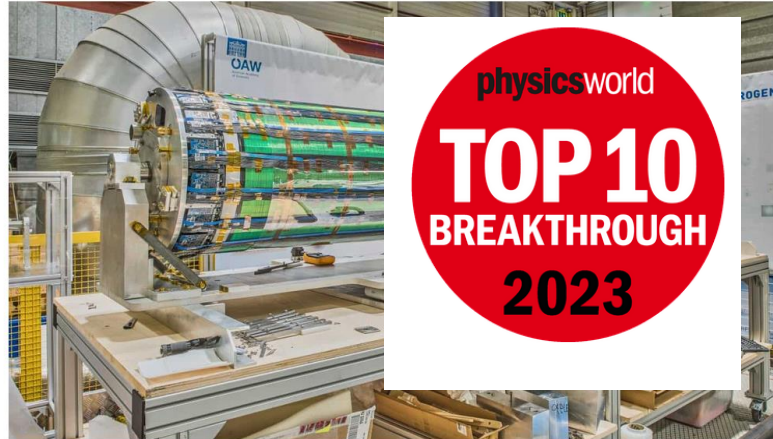
To [Walter de Heer](#), [Lei Ma](#) and colleagues at Tianjin University and the Georgia Institute of Technology, and independently to [Marcelo Lozada-Hidalgo](#) of the University of Manchester and a multinational team of colleagues, for creating a functional semiconductor made from graphene, and for using graphene to make a switch that supports both memory and logic functions, respectively. The Manchester-led team's achievement was to harness graphene's ability to conduct both protons and electrons in a device that performs logic operations with a proton current while simultaneously encoding a bit of memory with an electron current. These functions are normally performed by separate circuit elements, which increases data transfer times and power consumption. Conversely, de Heer, Ma and colleagues engineered a form of graphene that does not conduct as easily. Their new "epigraphene" has a bandgap that, like silicon, could allow it to be made into a transistor, but with favourable properties that silicon lacks, such as high thermal conductivity.



▶ [Proc Natl Acad Sci U S A. 2024 Nov 25;121\(50\):e2410420121. doi: 10.1073/pnas.2410420121](#)

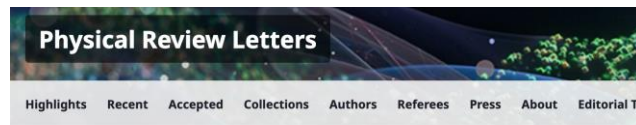
Uncovering the mechanical secrets of the squirting cucumber

Antimatter does not fall up



Going down: ALPHA-g's barrel scintillator being assembled at CERN. (Courtesy: CERN)

To the ALPHA Collaboration for showing that antimatter responds to gravity in much the same way as matter. The physicists used the ALPHA-g experiment at CERN to make the first direct observation of free-falling antimatter atoms – antihydrogen that comprises an antiproton bound to an antielectron. This was done in a tall cylindrical vacuum chamber in which antihydrogen was first held in a magnetic trap. The antihydrogen was released from the trap and allowed to annihilate at the walls of the chamber. The team found that more annihilations occurred below the release point than above it. After considering the thermal motion of the antihydrogen, the team concluded that antimatter falls down. Tantalizingly, the antihydrogen's acceleration due to gravity was about 75% of that experienced by normal matter. Although this measurement has a low statistical significance, it leaves the door open to new physics beyond the Standard Model.



FEATURED IN PHYSICS | EDITORS' SUGGESTION | OPEN ACCESS

Superradiant Neutrino Lasers from Radioactive Condensates

Scientists pick up shock waves from colliding galaxies



Artist impression: The supermassive black holes at the heart of each galaxy spiral in on each other, sending gravitational shock waves across the Universe

Pallab Ghosh
Science correspondent

Scientists have picked up shock waves from the orbit of supermassive black holes at the heart of distant galaxies as they begin to merge.

Scientists discover heavier version of proton with upgraded detector

Snappily named Xi-cc-plus, Cern physicists spotted the particle in shower of debris that lit up Large Hadron Collider



Welcome !

- Please take advantage of the opportunities in the department:
 - Schuster Colloquium, and seminars in your research areas
 - Summer party - research overview.....
 - Outreach opportunities.....

- Pleased to hear any ideas for Improving our department

