

Undergraduate Admissions Tutor: Dr Lee Thompson

Department of Physics and Astronomy
The University of Sheffield

Hicks Building, Sheffield S3 7RH
Telephone: 0114 222 4362
Email: Physics.UCAS@Sheffield.ac.uk
www.shef.ac.uk/physics

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The
University
Of
Sheffield.

Physics

Theoretical Physics

Physics with Astrophysics

Physics with a year abroad

Physics with Medical Physics

Chemical Physics

Physics and Philosophy



Physics and Astronomy



Welcome

How likely are advanced civilisations in distant galaxies?
What is the origin of mass? Is it the Higgs boson?
Is our universe accelerating?
How will we generate enough energy for everyone in 2100?
Can we reverse global warming through carbon capture?
Is time travel possible?
Are there habitable planets in other star systems?
How big is the biggest star in the universe?
Can we make a solid state quantum computer?

If you chose to come to Sheffield to study physics you will join a community of 35 academic staff, 100 researchers and 300 undergraduate students researching answers to these questions. Different degree choices and optional modules allow you to tailor your learning to specialist interests and careers.

Each year around 30% of our students graduate to undertake research degrees. Most others find high quality employment in a vast range of different industries.

Oclaro - Research and development engineer - Sellafield - Graduate trainee - Project manager - Actavis - Pharmaceutical - production process operator - Addenbrookers Hospital - Trainee clinical scientist - Aero Engineer Contracts - Graduate mechanical engineer - Allocate Software - Admin assistant, American Museum of Natural History - Research scientist (astronomy) - Appco - Charity fundraiser - Atomic Weapons Establishment - Nuclear scientist - Australian Nuclear Science & Technology Organisation - Postdoctoral research fellow - BAe Systems - Graduate engineer - BG Group - Graduate trainee - Gas marketing and trading - Bluefin Solutions - SAP consultant - BP - Petrophysicist - BSUH University - Hospitals Trust - Trainee medical physicist - Castle Hill Hospital - Trainee clinical scientist (Medical Physics) - CERN..

Focus on...

ASTROPHYSICS

Academics Dr Stuart Littlefair and Prof. Vik Dhillon are searching for planets that might be habitable. They wait for planets to pass in front of distant stars and look for dips in the stars intensity due to absorption by the planet. They are searching for a unique combination of ozone and carbon dioxide - a signature that life could be present. The team have spent many years developing instruments sensitive enough to look for life in this way. Last year Sheffield undergraduate Liam Hardy travelled to Tenerife for his final year project to test the method. Liam observed a distant exoplanet pass in front of star...

We are one of very few departments in the UK to offer a dual honours course where 50% of the modules are specific to Astrophysics. X of our academic staff are active researchers in astrophysics and we offer around y modules covering topics from cosmology to the astro-biology.

The department owns three telescopes. Two are on the roof of the department. The one pictured is a cccc... that students use to observe in first and second year modules. We have a second roof mounted robotic telescope can be controlled remotely. The third telescope is in Tenerife. In years three and four students have a range of opportunities to travel to the Tenerife observatory, or as another option control the instrument remotely from Sheffield.

Research projects available to students in years 3 and 4 cover topics from ... to...

Every year we take z PhD students in astrophysics related research

Focus on...

PHYSICS for the LIFE SCIENCES

The research we do

The facilities we have

The modules we teach



Focus on...

PARTICLE PHYSICS

The facilities we have

The modules we teach

Last year was an exciting time to be in the physics department in Sheffield. Several academic staff are directly involved in the Large Hadron Collider at CERN. Dr Stathes Paganis teaches atomic physics, electromagnetism and runs the second year lab. He directly helped analyse the data that discovered the Higgs boson. Prof. Dan Tovey teaches advanced quantum mechanics and is part of a team investigating evidence for supersymmetry. Dr Davide Costanzo

Dr Paganis explains, "The Higgs boson shows us how electromagnetic and weak nuclear interactions were the same just after the big bang, but are now very different. Undergraduate students are currently helping me to analyse the vast amount of data from the LHC. The question now is whether the Higgs is fundamental, or whether it is built from other, new particles with new interactions. Maybe there are other forces to be found?"

Focus on...

PHYSICS for INDUSTRY

As well as inspiring future generations the department has many projects that of direct value to industry.

Particle physicists have a range of methods to detect different sub atomic particles. Neutrons are one of the more difficult - they require special material to create charged particles from a neutron collision. He3 is typically used, but there is only so much He3 available and it is very expensive. Finding a cheaper method was a challenge that Sheffield research fellow Dr John McMillan embraced. John found that cosmetics material boron nitride was both pure enough, and contained enough Boron10 isotope to convert neutrons to alpha particles. The home office are currently funding John to further develop the detection method for screening cargo at ports. Identifying different radioactive materials is also a popular second year laboratory experiment that John has set up to help teach this important aspect of physics.

Dr Lee Thomson is the departments admission tutor, but he also recently been awarded a research grant by the Department for Energy and Climate Change to develop ways of detecting the storage of CO2 underground, using cosmic rays. Different types of rock have absorb cosmic muons with different strength and by placing detectors underground and measuring the cosmic muon flux at different angles the storage of CO2 can be monitored.

The energy theme runs through much of our materials science research and teaching. We deliver a module on the physics of sustainable energy. In conjunction with the CO2 storage research last year undergraduates investigated cosmic ray detectors using plastic scintillators. Around 20 undergraduate and postgraduate students are developing low cost solar cells from special combinations of molecular compounds and nanomaterials. Several of these new materials are synthesised in the chemistry department across the road. We have access to high quality industrial grade fabrication facilities housed within the nanoscience research centre.

The department is also host to the UK's largest domestic solar energy micro-generation database, where UK residents collaborate with us by donating electricity generation data to understand how often solar cells fail and how efficient they are.

Teaching is another area that we are excellent at supporting. There are now many different routes to becoming a teacher and together with the careers service we support all of them. Last year we ran undergraduate projects where new science teaching methods were investigated at secondary schools. Sheffield University based "Science Brainwaves" are UK leading science communication group that undertake a vast range of activities with schools and community groups. If you are interested in teaching then join them.

We have several specialist degrees for industry and teach modules specialising in team working, computer programming, instrumentation, and enterprise.

Our specialist degrees include

Physics with Medical physics
Chemical physics
Physics with computer science

www.microgen-database.org.uk
www.sciencebrainwaves.com
www.shef.ac.uk/careers

Focus on...

QUANTUM MECHANICS



For many years the department has been at the forefront of research into quantum dots. These incredible artificial atoms work in a strange quantum mechanical world. We are now applying our expertise to try and create a quantum computer. A classical 'bit' of data can have one of two values, '0' or '1'. Its quantum counterpart, the qubit, can have both values at the same time! Quantum computers using qubits could out-perform current computers by huge margins. Companies are already working with the Sheffield research team to try and unlock this potential.

Undergraduate Degrees

Physics and Astrophysics
Physics
Medical Physics



The way that we teach

University Life

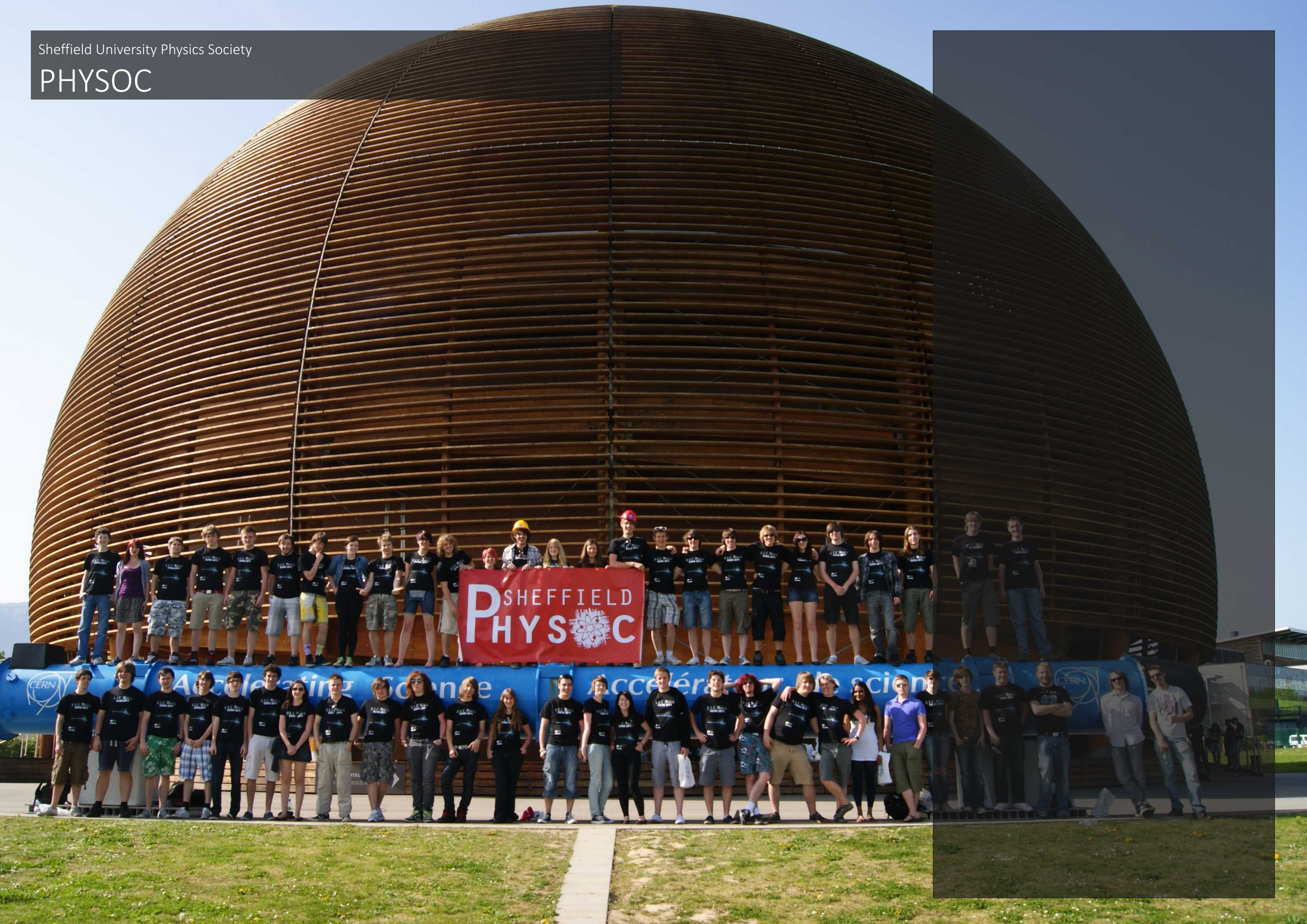


The University of Sheffield is one of the best in the country. It combines high quality teaching and research across a wide range of subjects. In 2011 it was voted the very best university in the UK. The University Union is widely recognised as being among the best in the UK. It houses two bars, a night club and a 400 seat cinema.

There are around 150 different clubs and societies; the physics society being among the most active. The University owns a designated sports centre with a swimming pool, gym, synthetic football and hockey pitches and even an indoor climbing wall. The sports centre, accommodation and teaching and research facilities all lie within one mile. The accommodation is situated towards the western edge of the city and while the walk is only 15 minutes there are also frequent buses.

Sheffield University Physics Society

PHYSOC



The City of Sheffield



Sheffield city is the UK's 5th largest. It has one of the lowest living costs of any University city and is also the greenest city in the country. It borders the peak district and many students make good use of this for climbing, walking cycling and running. The city itself has international venues for entertainment and sport.