IOP Institute of Physics

FREE ADMISSION

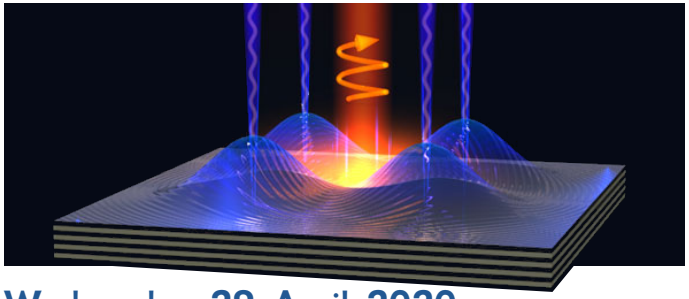
Wolverhampton Physics Center

Friday 3 April 2020

Dr. Hamid Ohadi (University of Saint Andrews)

Playing with weird quantum fluids and making them do things

Physics broadly studies two types of objects: light and matter. In modern physics, where everything comes down to "particles", this gives rise to force-carrying particles, the bosons, of which the photons—the particles of light—are the most famous examples, as well as a wealth of material particles (electrons, nucleons, together forming atoms, etc.) One of the greatest success of Physics was to describe the interactions between these particles, in particlar the interaction between light and matter (quantum electrodynamics). In the low-energy, non-relativistic limit, known as quantum optics, one can bring one photon to interact strongly with one material excitation, thus giving rise to new objects which are neither ligth nor matter but a mixture of both, inheriting their opposite characteristics, such as lightspeed propagation and very strong interactions. Dr. Hamid Ohadi, who leads the Quantum Fluids of Light group in the University of Saint Andrews, will introduce these strange quantum objects and show how, by condensing them into fluids, he can manage to make them perform fascinating tricks in his laboratory, opening new venues of fundamental research and promising ground-breaking applications.



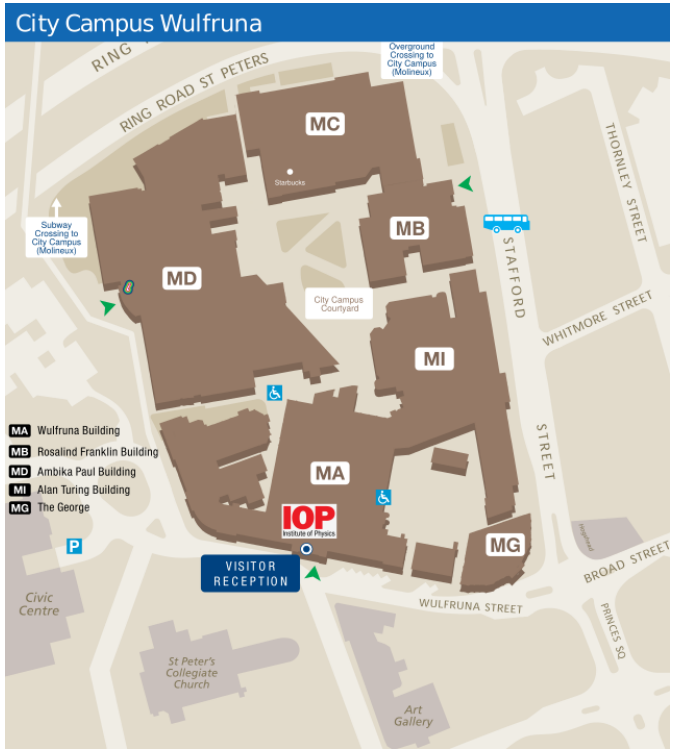
Wednesday 29 April 2020

Dr. Martin Khechara (University of Wolverhampton)

The most DANGEROUS experiments in Physics

As every other enterprise of exploration, Science can be quite a risky business. Some of the most dangerous experiments ever performed, like the Trinity test, or with controlled fusion, or with the LHC close to creating black holes, or at the Extreme Light Infrastructure on the verge of tearing-out spacetime, are within the realm of Physics (experiments in biology and/or with people can also be notoriously nasty). In this closing lecture to the Series (not coming last for safety reasons), Dr. Khechara—the Outreach scientist who goes where nobody went before—will give an overview of some of the most dangerously mad experiments ever performed, and will actually proceed to bring some of them on stage, putting himself at risk against the elements of Nature, in a fight against electricity, radioactivity, gravity, chemistry, light and matter. All this in under one hour.

Venue: University of Wolverhampton
City Campus, Wulfruna building (MA)
Wulfruna street, Wolverhampton WV1 1LY
Contact: f.laussy@wlv.ac.uk
Tel: +44 (0) 1902 321 000



Refreshments are available from 7.00pm.
Lectures start at 7:30pm.
We finish by 9:00pm.
This is free and open to all.

IOP Institute of Physics

UNIVERSITY OF WOLVERHAMPTON
KNOWLEDGE • INNOVATION • ENTERPRISE

West Midlands Wolverhampthon

@PhysWlv #IOPwlv

TinyURL.com/y56cjyvr

Evening Lectures Program 2019-2020

Wolverhampton Physics Center

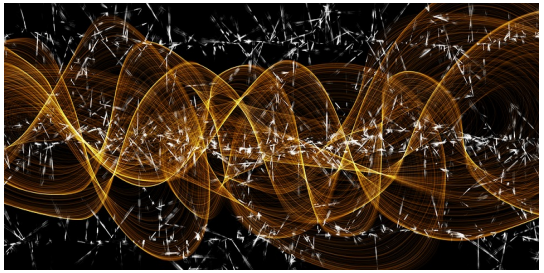
UNIVERSITY OF WOLVERHAMPTON
KNOWLEDGE ▪ INNOVATION ▪ ENTERPRISE

Wednesday 2 October 2019

Dr. Carlos Sánchez Muñoz (University of Oxford)

The tiniest possible sound

Vibrations permeate and impact our existence at all possible levels, from the gentle sound of a morning bird to the dramatic consequences of an earthquake. Our sensorial perception of vibrations, sound, has shaped our relationship with Nature and within ourselves, propelling our evolution through the ability to speak and ultimately leading to one of the oldest and most sophisticated forms of artistic expression: Music. Now, after two million years of human history, our ability to perceive vibrations has finally escaped from the tight confines of our senses. Recent technological progress is bringing us closer to the perception of the tiniest possible form of vibration—the phonon—living in the realm of quantum mechanics. In this lecture, Dr. Sánchez Muñoz will present the current scientific efforts toward the realization of quantum sound, and discuss the consequences that this will have in our everyday life and, ultimately, in understanding our place in the universe.



Wednesday 16 October 2019

Prof. Fabrice Laussy (University of Wolverhampton)

The Nobel Prize in Physics

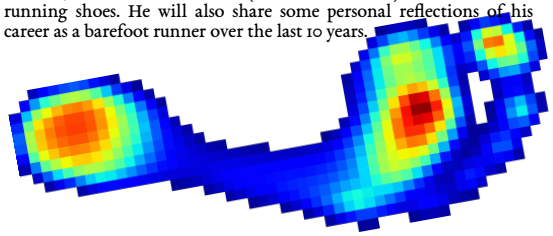
The Nobel Prize is synonymous with the most prestigious award that can be betstowed upon the human's endeavours to serve and advance humanity, from Peace to Literature and passing by the most fundamental of all Sciences: Physics. At such, it is one of the most highly regarded event in the Year, pointing at the latest directions in which the human's genious has been doing wonders. It is also a treasure trove of anecdotes, injustices, curiosities and mistakes that make the delight of everybody interested in what's buzzing in the highest intellectual circles, something between gossips and the History of Science. In this Lecture, Prof. Laussy will give his traditional Nobel Lecture where, along with the most crunchy bits of this socio-scientific celebration, he presents in layman's terms the Science honoured on this Year (recipients unknown at the time of writing but not at the time of Lecturing).

Wednesday 6 November 2019

Prof. David Whittaker (University of Sheffield)

The Science & Art of ... Running!

According to legend, Pheidippides, the first marathoner, ran from Athens to Sparta in less than 36 hours. After the Battle of Marathon, he ran straight to Athens to inform of the Greek victory over Persia. He did all that barefoot. In our days where science can optimize everything, even activities practiced since Antiquity, like running, have been put to the scrutiny of analysis, simulation and experimentation. Yet, there are several cases where the old-way-to-do-it seems to overcome all ingenious and sophisticated engineering strategies to boost our efficiency and performances. Running is a typical case where an extreme minimalist approach seems to compete with the best sporty gear, and several champions crossed the line first in top competition events without shoes. In this off-the-beaten track Lecture (sensitive soles, beware), Prof. David Whittaker will review some of the science about the evolution of humans as endurance runners, and discuss the science (or rather lack of it) of the benefits of running shoes. He will also share some personal reflections of his career as a barefoot runner over the last 10 years.



Wednesday 18 December 2019

Dr. Elena del Valle (University of Wolverhampton)

Christmas Lecture:

For the *Love* of *Music*! (and all the Physics behind it...)

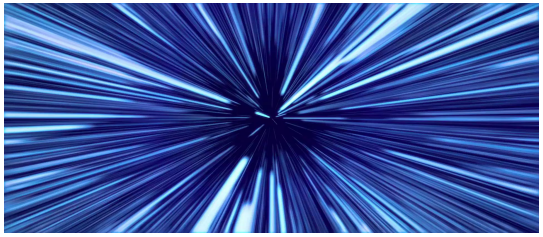
Music resonates with the deepest roots of our Human nature. It has the power to change our moods, bring us peace in those hard moments and help us connect with others and their creativity. Understanding what defines Music is to explain how the sounds that we hear must be structured in order to feel "good" and what makes us people able to enjoy them. This involves mathematical patterns, their realization through various physical media and their eventual combination in a way that brings meaning or sense. At such, this is a question ideally put to a physicist, whose explorations can add a new dimension to the appreciation of music for everybody with an interest in either Science and/or Art. In this Christmas Lecture, Dr. del Valle will unravel the Physics and Maths that explain what makes Music, in a festive presentation that will be using several instruments and some talents from the audience!

Wednesday 15 January 2020

David Wilkinson (Nottingham Trent University)

To *c* or not to *c* – Physics in science-fiction writing

Science fiction has long been divided between authors who try to get all the physics right and those who abandon any pretence at considering real-world science at all. This lecture looks at some of those who tried and considers both how well they did and the innovative ideas they have come up with for future physics and technology. Examples including Le-Guin's quantum-entanglement communications, Asimov's robots, Reynolds' consequences of the Twins Paradox and Niven/Pournelle's use of an Orion propulsion system. Many others are discussed along with some of Wilkinson's own ideas. And of course, there is the perennial question in space-based future fiction – whether faster-than-light travel is permitted. To have $>c$ or $<c$? That is the question...



Monday 27 January 2020

Dr. Andrew Ramsay (Hitachi Cambridge Laboratory)

Quantum 2.0

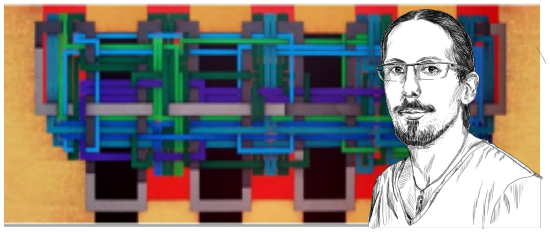
The minimum feature size in the CPU of your phone or laptop is now about 7nm, or 20 atoms of Silicon. This is close to the physical limit of one atom. The CPU is an affordable wonder of the world. Since the exponential growth in computing power, the main driver of the information age, is slowing down, scientists started to think about the physical limitations of computing. One theme to emerge was quantum information. What if, rather than devices to process bits of information using quantum mechanical principles, instead, the information itself is quantum? If you can harness quantum superposition and entanglement, what new technologies are possible? For the last 20 years, inspired by the possibilities, scientists and engineers have made great strides in the construction and control of quantum devices. In this talk, Dr. Ramsay from the Hitachi labs will introduce the key concepts in quantum information for a lay audience, discuss some of the technologies, such as computing, cryptography, and clocks that may emerge, and give a personal perspective on how this field is reshaping and testing our understanding of quantum mechanics.

Wednesday 12 February 2020

Prof. Simone De Liberato (University of Southampton)

Scientific entrepreneurship

Physics is at the forefront of technology, from optics in the middle age and the law of falling bodies in the 17th century to quantum physics in our current time, passing by electromagnetism, thermodynamics, nuclear forces and many other disciplines that each shape an industry of its own. In response to a patent officer, Physicist Richard Feynman once replied *"there are so many ideas* [...] *that I'd be here all day telling you stuf*". In a world that always move faster, big changes require the scientist to mutate into an entrepreneur. In this Lecture, Prof. de Liberato, leader of the Quantum Theory and Technology Group at the University of Southampton, and a successful scientific entrepreneur who started several companies (Hypios, AdQuantic, ...) will share his insights and experience in bringing smart and new ideas into everybody's life.

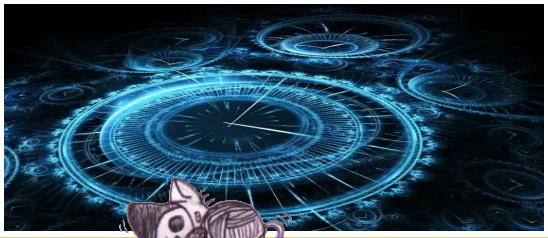


Wednesday 4 March 2020

Dr. Anton Nalitov (University of Wolverhampton)

Time Crystals shades of impossible

Although they don't allow time travel, time crystals are still incredible. For more than a century, we know from Einstein's theory of relativity that space and time are inseparable and that, in fact, we live in spacetime. But how far can this interrelation go into our macroworld and the microworld? One of the border lines separating space from time is the existence of crystals, states of matter perfectly self-ordered in space. Their potential spacetime or time counterparts would have to evolve periodically without friction. Quantum physics shows examples of frictionless motion such as superconductivity and superfluidity, but can this be periodically self-ordered? These seemingly basic questions are being tackled by physicists for almost a decade now. In this lecture, Dr Nalitov will overview the progress in this emerging field, connecting the dots in the physics of the impossible.



IOP Institute of Physics

@PhysWlv