UNIVERSITY OF BIRMINGHAM | SCHOOL OF PHYSICS AND ASTRONOMY

IOP Institute of Physics

Evening Lectures Programme 2020/21

Lectures are free and open to all. Registration is essential for online lectures.

In light of the recent and ever-changing situation around COVID-19, the lectures for autumn/winter 2020 will be delivered online. We will review this approach in the new year, so please check back on our website to see how you can access the lectures in the spring.

For latest updates and to find links to register for all webinars please visit
www.birmingham.ac.uk/IOPLectures

Photo by Graham Holtshausen on Unsplash

For more information please contact physics.outreach@contacts.bham.ac.uk

IOP Institute of Physics

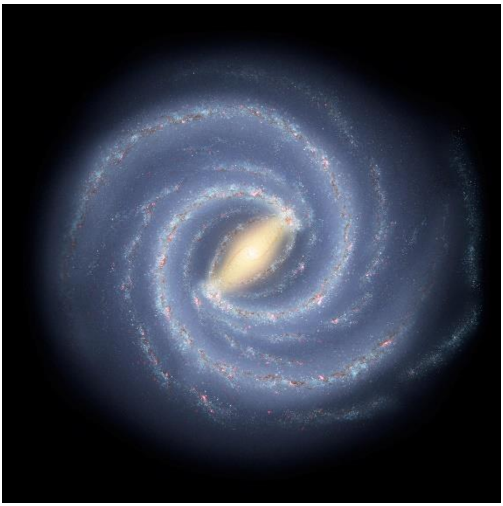
Tuesday 27th October 2020, 7:30 pm - 8.30 pm

Prof Victor Debattista, University C. Lancashire

Our home galaxy, the Milky Way

The Milky Way, our home galaxy, is comprised of some hundred billion stars of which the Sun is a typical example. The Milky Way has an X-shaped central bulge, a bar which tumbles about the centre, a thin and thick disc, and an outer warp. The European Space Agency's ongoing Gaia space mission is mapping these structures in 3D for the first time. Understanding these big datasets requires careful comparison with detailed simulations; my group has pioneered the use of a particular type of model which has enabled us to drive exciting new discoveries on the nature and evolution of the Milky Way. I will present a few examples of our work and describe how these efforts help us understand galaxy formation in general.

Register for this event



This artist concept illustrates the new view of the Milky Way. Credit: NASA/JPL-Caltech

IOP Institute of Physics

Tuesday 17th November 2020, 7:30 pm - 8.30 pm

Prof Chris Hooley, University of St. Andrews

"What's all this about bagels and pastries?: topological phases of matter and the 2016 Nobel Prize in Physics

The 2016 Nobel Prize in Physics was awarded to David Thouless, Mike Kosterlitz and Duncan Haldane, for "for theoretical discoveries of topological phase transitions and topological phases of matter." But what is a topological phase transition, and what is a topological phase of matter? In this talk, I will give an accessible introduction to the key physics for which the 2016 Nobel prize was awarded.

I shall discuss the Kosterlitz-Thouless phase transition. When a two-dimensional superfluid (e.g. a thin film of liquid helium-4) is heated, rather than boiling in a conventional fashion, it spontaneously develops pairs of vortices and antivortices. The production of these vortex-antivortex pairs – which are topological structures – causes the liquid to lose its superfluid properties, i.e. to 'go normal'.

I shall talk about the work of Haldane and others on topological phases of matter. These are phases between which a local observer would not be able to distinguish, but which are nonetheless distinct. Think of a Möbius strip; due to the overall twist, this is different from a regular loop, even though an ant crawling along the surface cannot tell which of the two it is sitting on. A similar distinction applies to various different phases of quantum matter, including the so-called 'topological insulators'.

Register for this event

IOP Institute of Physics

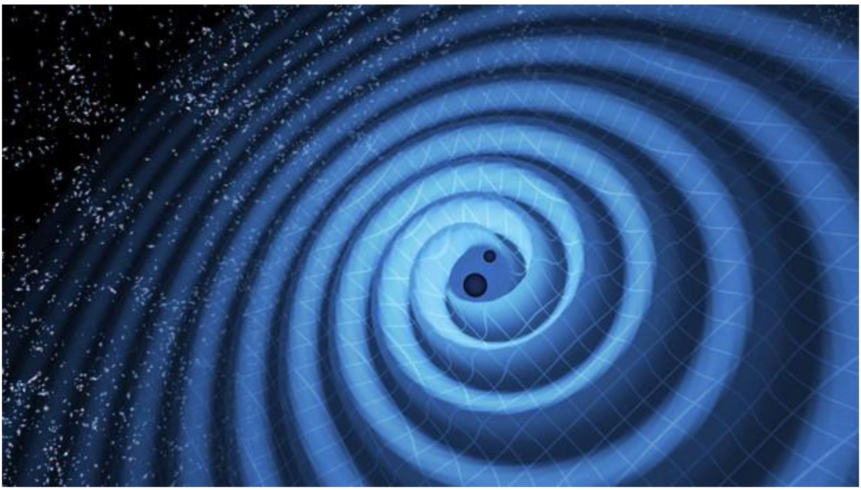
Tuesday 8th December 2020, 7:30 pm - 8.30 pm

Dr Davide Gerosa, Institute of Gravitational Wave Astronomy, University of Birmingham

The (Gravitational) Sound of the Universe

Most of what we know about the Universe (planets, stars, galaxies...) came to us through light. But it's gravity, not light, that keeps the Universe together. Straddling the boundaries between astronomy and relativity, gravitational waves are the fundamental messenger of gravity and provide a new way of exploring the cosmos. Why should we only look at the Universe when we can also hear it?

Register for this event



This illustration shows the merger of two black holes and the gravitational waves that ripple outward as the black holes spiral toward each other. Credit: LIGO/T. Pyle

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