

# Keele Physics Centre: Evening Lecture Programme 2020-21

## 15<sup>th</sup> October 2020 In search of the origin of mass

Prof. Kostas Nikolopoulos  
University of Birmingham

Mass is a concept that we confront in our everyday life. It comes in several forms that are subtly different, but very often it is thought of as a measure of inertia; the property of matter that quantifies its resistance to acceleration. But where does mass come from? In addressing this question, we will discuss what we know and what we are still trying to understand regarding the origin of mass and we will take a journey from experiments at the CERN Large Hadron Collider, to experiments in deep underground laboratories.

<https://attendee.gotowebinar.com/register/285761282390671883>

Due to COVID-19 the lectures within this programme are to be delivered online using the GoToWebinar platform, not in person at Keele University. Please use the links below each talk abstract to register. All the lectures are free to attend. If you have any questions regarding this lecture programme, please contact: [Scott Walker \(s.r.walker@keele.ac.uk\)](mailto:s.r.walker@keele.ac.uk)

## 17<sup>th</sup> December 2020 What are you made of?

Prof. Raphael Hirschi  
University of Keele

Most of us learn about the periodic table in school. This table lists the chemical elements we are made of as well as other elements like silver and gold that we can find on earth. "Where do these elements come from?" and "What are we made of?" are long-standing questions for humanity. In this talk, I will describe how we can use computers as virtual Nuclear Physics and Astrophysics laboratories to answer these important questions. I will start by introducing stars and their importance and then explain how they produce chemical elements (nuclides to be precise) in their interior. I will also explain how scientists combine computer simulations, theory, nuclear physics experiments and astronomical observations to determine where the iron in our blood, the oxygen in our lungs and the gold in the banks come from.

<https://attendee.gotowebinar.com/register/3143781230096922891>

## 21<sup>st</sup> January 2021 The life and work of William and Caroline Herschel

Dr. Mark Whalley  
Institute of Physics

William Herschel is one of the outstanding figures in the history of astronomy and physics having discovered the planet Uranus and Infrared radiation. However, his sister, Caroline, is often overlooked, yet she discovered several comets and was instrumental in William's work. In this talk we will not only take a whistle-stop tour of the unconventional lives and work of William and Caroline, from Hanover to Bath and then to Slough, but we will look at the historical and social context that enabled such discoveries to be made. This talk will be of interest to anyone with an interest in the history of astronomy and physics, but also to teachers of science wanting to see how science is rooted in the society in which it is produced.

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## 11<sup>th</sup> February 2021 Extra-terrestrial geology; exploring Mars as an earth-bound astronaut

Dr. Natasha Stephen  
University of Plymouth

Dr. Natasha Stephen is a planetary scientist studying the origin and geological evolution of bodies within our Solar System, including Mars, the Moon and asteroids. Natasha uses samples returned from the Red Planet to study past volcanic eruptions on Mars, and uses spacecraft data from satellites and Mars rovers to link these samples to the Martian surface. Both NASA and ESA have sent recent missions to Mars, and there is a new Mars rover, Perseverance, about to touch down in the coming days... So, join us as we explore what we already know about the Red Planet, and what we have yet to discover!

<https://attendee.gotowebinar.com/register/8324696513054097933>

## 25<sup>th</sup> February 2021 Nuclear data – the original big data challenge

Allan Simpson  
National Nuclear Laboratory

Ever since Rutherford split the atom, understanding the probabilities that define our nuclear age has been critical to our application of nuclear technology. In this seminar, Allan Simpson of the National Nuclear Laboratory will take you on a journey to discover just why the data that helps us understand the inner workings of nuclear reactors, the evolution of stars or treat cancer patients in our hospitals is the original big data challenge and just why we'll be seeking perfection for years to come.

<https://attendee.gotowebinar.com/register/641901894720595211>

In order to improve accessibility, we are hopeful that a number of lectures within this programme will be accompanied by a British Sign Language interpreter. There may also be several additional lectures added to this series after this programme is published. Please check [www.events.iop.org](http://www.events.iop.org) for the latest information.

## 18<sup>th</sup> March 2021 SMR lead-cooled fast reactors

Rossella Bonetti  
Ansaldo Energia

The UK is at the forefront of a new industrial revolution with the ambitious target to reach net zero greenhouse gas emissions by 2050. The clean growth, at the heart of UK industrial strategy, is pursued through a new technology framework where nuclear will play a vital part in the energy mix providing low carbon power. The future success of the nuclear industry is ensured through adopting new construction techniques and innovative approaches to manufacturing that provide a significant cost reduction in building new reactors. Small modular reactors (SMRs) are under development as a viable proposition in supporting deployment of low carbon generation that is quicker to deploy and easier to finance. In this seminar, Rossella Bonetti will explain how Ansaldo aim to develop an SMR lead-cooled fast reactor to reach the market after 2030.

<https://attendee.gotowebinar.com/register/6890581507260685323>

