

THE SCIENCE FACULTY SEMINAR SERIES 2024

THE SCIENCE FACULTY AT THE UNIVERSITY OF CAPE TOWN INVITES
YOU TO THE 2024 SEMINAR SERIES

This seminar series is organised by the Science Faculty Research Committee. Everyone interested is welcome to attend.

Venue & time

PD HAHN LT 2

Wednesday, 24th April

13:00 – 14:00

Speaker:

Prof. Mark Blumenthal
Department of Physics

Title:

A Beginners Guide to Capturing Single Electrons

Abstract:

The electron is small, so small that physicists have confined it to the realm of a point particle where in the world of quantum mechanics it is assumed to be dimensionless.

In this talk I will discuss the first pioneering experiments that led to the discovery of this elusive particle. How do we determine its mass and charge and how can we trap and isolate single electrons that will allow for the development of new advanced quantum technologies.

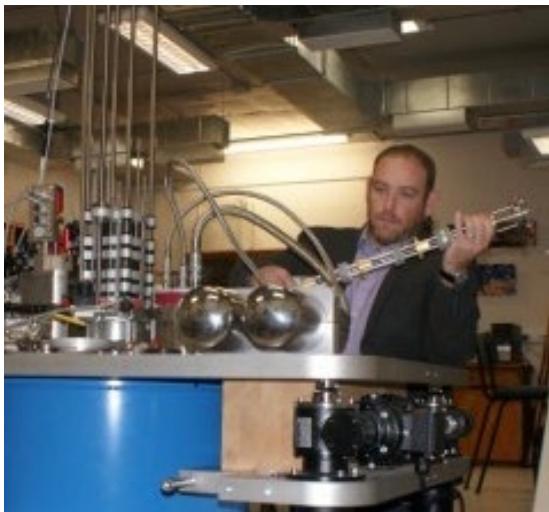
The latest work on the control and manipulation of single electrons carried out within the Department of Physics at UCT using our cryogen free dilution fridge (the coldest place in Africa) will also be presented.

RSVP:

For catering purposes please RSVP by sending an email to elhaam.taladia@uct.ac.za by Monday, April 22nd 2024



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Prof. Mark Blumenthal

Professor Mark Blumenthal has extensive experience in low-dimensional nanotechnology electron transport measurements at cryogenic temperatures, gained through a PhD at the Cavendish Laboratory in Cambridge (2007) and as a Research Scientist at the National Physical Laboratory in the UK. This included research on low-dimensional material systems and semiconductor processing at the nanoscale, resulting in peer-reviewed publications and conference proceedings.

From 2009 to 2011, he worked as a Senior Research Physicist at Siemens Magnet

Technology in Oxford, focusing on Magnetic Resonance Imaging (MRI) superconducting magnets. He acquired significant experience in measuring magnetic field interactions at liquid helium temperatures and investigated transport mechanisms in superconducting materials, leading to patented inventions.

Returning to South Africa in 2011, he established the NanoElectronics Research Group at the Department of Physics. Over six years, he secured funding for and established a cutting-edge research facility for unique material growth and characterization. He actively engages in undergraduate teaching and supervises a large group of postgraduate students.

His group also focuses on experiments involving high-frequency single-electron pumps for quantum and metrological applications, offering support to researchers across the country in low-temperature measurements and investigating novel nanomaterial transport properties.