

# Mott's Physics in Nanowires and Quantum Dots

An Exploratory Workshop *of the* European Science Foundation

Gonville and Caius College,  
University of Cambridge, UK

31 July – 2 August 2006



Sir Nevill Francis Mott in 1980

## Organisers

### Loughborough University

Sasha Alexandrov

Jim Hague

Klaus Neumann

John Samson

Kurt Ziebeck

### Cambridge University

Yao Liang

## Speakers

A S Alexandrov  
A F Andreev  
S Aubry  
J A C Bland  
J Bonča  
I Bozović  
A M Bratkovsky  
F Brosens  
B R Butka  
H Capellmann  
E A Davis  
J T Devreese  
P P Edwards  
K B Efetov  
H Fehske

Loughborough, UK  
Moscow, Russia  
Paris, France  
Cambridge, UK  
Ljubljana, Slovenia  
Brookhaven, USA  
Palo Alto, USA  
Antwerpen, Belgium  
Poznań, Poland  
Aachen, Germany  
Cambridge, UK  
Antwerpen, Belgium  
Oxford, UK  
Bochum, Germany  
Greifswald, Germany

Yu A Firsov  
N García  
M Hohenadler  
V V Kabanov  
P E Kornilovitch  
P B Littlewood  
F Mancini

Saint Petersburg, Russia  
Madrid, Spain  
Graz, Austria  
Ljubljana, Slovenia  
Corvallis, USA  
Cambridge, UK  
Salerno, Italy

D Mihailović  
M Pepper  
K H Ploog

Ljubljana, Slovenia  
Cambridge, UK  
Berlin, Germany

T Schimmel

Karlsruhe, Germany

A Simon  
J Spatek

Stuttgart, Germany  
Kraków, Poland

A M Stoneham  
C Taliani  
W von der Linden

London, UK  
Bologna, Italy  
Graz, Austria

Current-controlled polaronic switching of molecular quantum dots  
Manifestation of additional dimensions of space-time in semiconductor quantum dots  
Ultrafast polaron transport in biosystems  
Ferromagnetic rings  
Conductance through coupled quantum dots  
Nano-structuring cuprate superconductors  
Electron transport in nanostructures, including molecular quantum dots  
Quantum statistics for a finite number of polarons in a quantum dot  
Correlated electrons and transport in nanostructures  
The interplay between superconductivity and magnetism  
Sir Nevill Francis Mott (1905-1996) – reminiscences  
Fröhlich polarons from 0D to 3D: concepts and recent developments  
Liquid-liquid phase separation in metal-ammonia solutions: Was Ogg or Mott right?  
Non-Fermi liquid behaviour of a Fermi gas with a repulsion  
Luttinger liquid, Peierls- or Mott insulator — quantum phase transitions in one-dimensional electron-phonon systems  
Spin-charge separation phenomena in quantum nanowires: theory and experiment  
Is there ballistic transport in metallic nanoobjects? Ballistic versus diffusive transport  
Carrier-density effects in many-polaron systems  
Magnetic quantum oscillations in nanowires  
Monte Carlo simulations of lattice polarons and bipolarons  
Condensation of exciton polaritons  
Non-Fermi liquid behaviour and pseudogap opening in the 2D Hubbard model within COM  
Functional properties of molecular  $\text{MoSi}_x$  nanowires: from structure to magnetism  
Disorder and interaction effects in one dimension  
Fabrication and electronic properties of perfect quantum wires and dots of subnanometre dimensions  
The Single-Atom Transistor: An approach towards quantum electronics at room temperature  
A glimpse into subnano structures  
Localisation vs. delocalisation in correlated nanosystems within exact diagonalisation - ab initio approach  
Trapping and self-trapping: Polaronic defects in the bulk and at interfaces  
Organic semiconductors for spintronics  
Magnetic polarons and phase separation in the Kondo model

<http://www.lboro.ac.uk/departments/ph/nqd/>

