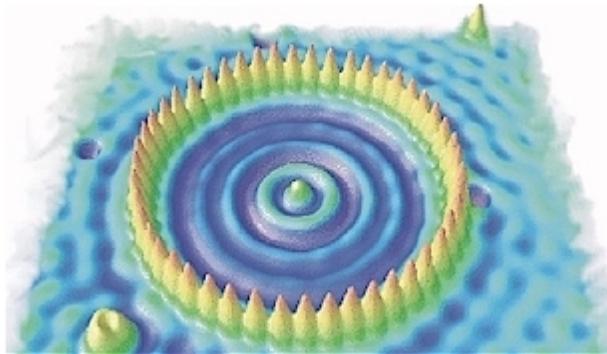


Fifteenth Chris Engelbrecht Summer School  
in  
Theoretical Physics



## Nanoscale Physics

21 January to 30 January 2004

Alpine Heath Resort  
Drakensberg  
Natal  
South Africa

The **Fifteenth Chris Engelbrecht Summer School in Theoretical Physics** is sponsored by the South African National Research Foundation (NRF). It is supported by the South African Institute of Physics (SAIP) and the Organisation of Theoretical Physicists (OTP).

### TIME AND VENUE

The school will take place from **Wednesday, 21 January to Friday, 30 January 2004** at Alpine Heath Resort, Drakensberg, Natal, South Africa.

### THEME

## Nanoscale Physics

### COURSE LECTURERS AND TOPICS

#### **Boris Altshuler**

Princeton University

Introduction into mesoscopic theory: Anderson localisation, disordered conductors, decoherence, universality aspects; interacting systems

#### **Carlo Beenakker**

Leiden University

Random-matrix theory of quantum transport; mesoscopic superconductivity

#### **Leonid Glazman**

University of Minnesota

Coulomb blockade; quantum fluctuations of charge; discrete electron states in a quantum dot; Kondo effect

#### **Leo Kouwenhoven**

Technical University Delft

Quantum transport in nanoscale devices; quantum point contacts; nanowires and nanotubes, design aspects of qubit circuits

#### **Ramamurti Shankar**

Yale University

Introduction to the renormalization group in general; introduction to Fermi liquid theory using the RG; application of these ideas to quantum dots

#### **Jan von Delft,**

Ludwig-Maximilians University Munich

Spectroscopy of discrete energy levels in ultrasmall metallic grains

### FORMAT

About 40 one-hour lectures will be presented in English.

### PARTICIPATION

The course is a graduate school aimed primarily at theoretical physicists and postgraduate students interested in broadening their knowledge of the field. Persons with other backgrounds are welcome to register, but we do expect all participants to have a suitable background in the natural sciences or engineering. Typically at least an honours degree with a good working knowledge of quantum mechanics and condensed matter physics is required, with some exposure to quantum field theory.

The following references will provide participants with a good idea of the type of material to be covered at the school:

*C Beenakker*, cond-mat/9612179 and

<http://ilorentz.org/beenakker/fulltext/beenakker92.pdf>

*L Glazman*, cond-mat/0302159

*R Shankar*, Rev. Mod. Phys. 66 (1994) 129–192

*J von Delft* and *DC Ralph*,

Physics Reports, 345 (2001) 61–173

### STUDENTS

Students are normally expected to find support from their home institution and/or thesis advisor to participate in the school. Funds are, however, available to support a number of bona fide, full-time local (South African) students. It is envisaged that the successful candidates will be subsidized up to 60% of their total costs for shared accommodation. Interested students are encouraged to apply as soon as possible. Applications for a subsidy should provide a brief summary of personal details and a motivation for participation, and must include a letter of recommendation from the Head of Department or thesis advisor. Complete applications should be sent to **Prof. HB Geyer** at the *secretariat address* below by **19 November 2003**. Only in cases of particular need will increased support be considered for well motivated and meritorious applications. It is unfortunately not possible to subsidize any travelling costs.

Applicants will be informed by **24 November 2003** if they had been successful. After that date all applications will be subject to available funding.

## Students from African Countries

A very limited number of scholarships are available to allow students from African countries to participate. The Ford Foundation indicated that they will favourably consider scholarships which will cover travelling, registration and accommodation costs. The same information, motivation and letter(s) of recommendation as above are required and should be sent to **Prof HB Geyer** at the *secretariat address* below by **19 November 2003**. Applicants will be informed by **24 November 2003** if they had been successful.

### ACCOMMODATION

Please see Alpine Heath Resort's own web page <http://www.alpineheath.co.za> for full details of facilities.

A special school package is offered to participants. Accommodation is provided in well-equipped 3-bedroom chalets (please see <http://www.alpineheath.co.za> for details) on the following basis:

Five persons per chalet — **R450** per person per day

Three persons per chalet — **R570** per person per day

Accommodation includes three meals per day at Alpine Heath Resort, as well as refreshments during two daily breaks and use of the conference facilities. Rooms are available from the afternoon of **Tuesday 20 Jan** and must be evacuated by noon **Friday 30 Jan**. The package does not include lunch on Sat 24 and Sun 25 Jan, allowing participants to make their own arrangements over the weekend. Dinner on Tue 20 Jan is included, as well as breakfast and lunch on Fri 30 Jan.

Room allocation per chalet will be done by the organizing committee on a 'first fully paid, first served' basis.

Deposit for accommodation (also see *Costs* below for further information and deadline details).

### DEPOSIT FOR ACCOMMODATION

The following deposits are required to secure accommodation at Alpine Heath Resort:

Five persons per chalet

**R1500 (US\$220 for participants from outside Africa)**

Three persons per chalet

**R1900 (US\$300 for participants from outside Africa)**

NOTE After the deadline of **5 December 2003** participants will have to make all accommodation arrangements directly with the management of Alpine Heath Resort, in which case the special school rate cannot be guaranteed any more.

### TRANSPORT

Transport between Johannesburg International airport and the school venue is being organized for all **lecturers** and for **international participants** according to the travel information they provide. Participants who would like to make use of this transport are expected to arrive in Johannesburg during the morning of **Tuesday 20 Jan 2004**.

All other participants are expected to make their own travel arrangements to arrive at the school venue at Alpine Heath during the afternoon of **Tuesday 20 January 2004**.

### COSTS

#### Registration fee

##### **Early bird (Deadline 5 December 2003)**

Regular participants R450 (US\$120 for participants from outside Africa)

Students R250 (US\$60 for students from outside Africa)

##### **Regular rates (After 5 December 2003)**

Regular participants R575 (US\$150 for participants from outside Africa)

Students R320 (US\$75 for students from outside Africa)

All course documentation is included in the registration fee.

The closing date for registration (with payment of early bird rate) and payment of an accommodation deposit is **Friday 5 December 2003**. The balance of accommodation costs is payable by **Friday 23 January 2004**.

### PAYMENT DETAILS

Participants resident in South Africa can pay by bank transfer or personal cheque. Foreign participants can pay by bank draft or bank transfer (in US dollars). All cheques and bank drafts should be made payable to '**Theoretical Physics Summer School**'. For bank transfers refer to the following information:

Bank	ABSA Bank Stellenbosch
Street Address	Plein Street, Stellenbosch
Postal Address	PO Box 138, 7602, Stellenbosch
Bank Code	63-04-10-45
Swift Code	ABSAZAJJ
Account Number	4046528525

If payment is made by bank transfer, a copy of the transfer instruction should be faxed to the secretariat at: **(+27-21-8083385)**.

Please ensure that you add your **REFERENCE NUMBER** on the Bank Deposit Slip / other documentation, which is submitted to the secretariat as proof of payment.

### ORGANISING COMMITTEE

WD Heiss (Chairperson)	University of Stellenbosch
N Chetty	University of Natal
J von Delft	Munich University
DP Joubert	University of the Witwatersrand
HB Geyer	University of Stellenbosch
FG Scholtz	University of Stellenbosch

### CONTACT INFO

#### Secretariat Address:

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University of Stellenbosch  
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E-mail: [physoffice@sun.ac.za](mailto:physoffice@sun.ac.za) or  
[hbg@sun.ac.za](mailto:hbg@sun.ac.za)