

Theory Days Transport in Quantum Wires and Dots

Nov. 17, 18 and 19, 2010

IRSAMC
Toulouse



Quantum transport
in nanostructures

Spin effects

Charge transport

DFT methods

UNIVERSITE
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THEORY DAYS ON QUANTUM WIRES AND DOTS

TOULOUSE, 17, 18 AND 19 NOVEMBER 2010

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1 Aim and scope

The aim of the meeting is to put together theorists interested in quantum transport in nanostructures, namely in quantum wires and quantum dots. Continued progress in nanoscience has made the control of matter on the scale of atoms and molecules become a reality. At this scale, quantum behavior is ubiquitous and understanding how basic principles of quantum physics determine the system properties is essential. We shall pay special attention to the role of the spin, a pure quantum property, in transport and the associated research field of spintronics. The spin-orbit interaction in nanostructures made of two-dimensional gases is drawing much interest due to its relationship with this incipient technology. Quite recently, spin injection in a semiconductor wire and its transport between two ferromagnetic contacts has been achieved. It is an important step towards the realization of the spin transistor, one of the most promising spintronic devices. We also plan to discuss the charge transport properties and its fundamental relation to the structure of quantum dots and quantum wires.

We plan to gather people from the various groups working in this domain in western Europe. The workshop is intended to be a working forum, thus rather informal. The format will consist in a series of long detailed talks, typically 1 hour (40 mn talk + 20 mn for questions) focusing in particular on ongoing problems and open ends. Some free time will furthermore be reserved for collective discussions. We thus urge participants to prepare their talks in this spirit. Ultimately a most efficient organization would consist in having a **limited number of talks per representative group** in order to avoid doublings.

If a consensus is reached during the workshop it would be highly profitable to envision a sequel to this workshop in order to possibly establish, at best collaborative links between the various groups with possible exchange of researchers and students, at worst an ongoing follow up of progress in the field.

2 Scientific program

The detailed program will be prepared as soon as possible after replies from participants. We plan to start the workshop on Wednesday Nov. 17th just after lunch and end it on Friday Nov. 19th early afternoon. This would allow participants to reach Toulouse in the morning of Nov. 17th and be back home in the evening of Nov. 19th.

A tentative program is thus :

Nov 17th (Wed) : 14 :00 - 17 :30 (3 × 1 hour + 1 coffee break)

Nov 18th (Thu) : 08 :30 - 13 :00 (4 × 1 hour + 1 coffee break)

Nov 18th (Thu) : 14 :30 - 18 :00 (3 × 1 hour + 1 coffee break)

Nov 19th (Fri) : 08 :30 - 13 :00 (4 × 1 hour + 1 coffee break)

Nov 19th (Fri) : possibly a short final session in the afternoon.

3 Practical aspects

3.1 Registration and lodging

There will be no registration fee. We shall cover lodging, meals, and local transportation for about 15 participants during the duration of the workshop (arrival Nov. 17th, departure Nov. 19th), on the basis of first confirmed, first served. Each participant's institute will have to **cover the travel expenses** to reach and leave Toulouse.

Participants will be lodged in hotels downtown Toulouse at walking distance from major metro stations along line B. There is a direct metro line (line B) connecting downtown to university. Travel takes about 20 minutes with trains every few minutes (less than 5 mn).

Meeting will take place at the IRSAMC in the university Campus, see map below.

3.2 Access to Toulouse

Airports

Toulouse airport is connected to major west European airports and hubs (Paris Orly and Roissy Charles de Gaulle, Munich, Frankfurt, London, Amsterdam) with regular connections by Air France/KLM, Lufthansa, British Airways for the major companies and also with connections by (Low Cost) Easy Jet. Plane provides by far the simplest access to Toulouse with reasonable fees for sufficiently early booking.

<http://www.toulouse.aeroport.fr/>

There is a shuttle to downtown (first stop at Compans Caffarelli, on line B of metro) every 20 mn (cost is 4 euros one way, 6.3 euros return trip) ; for details, see

<http://www.toulouse.aeroport.fr/fr/aeroport/acces-plans-parkings/acces/se-deplacer-en-transport-en-commun>

As soon as one catches the shuttle, it takes about half an hour to get to the University thanks to the connection with line B at Compans Caffarelli station.

An alternative access is provided by Carcassonne airport (about 45 minutes by car from Toulouse) which has a Low Cost access through Ryanair

<http://www.carcassonne.aeroport.fr/>

In case of major problem, we shall organize some transfer. It would be useful to know sufficiently in advance such details.

Train

Central station is Toulouse Matabiau connected to line A of metro (see below) and is connected to major french cities.

<http://www.gares-en-mouvement.com/gare-fr-1-frxyt.html>

Metro

Metro and bus connections (general) : <http://www.tisseo-urbain.fr/horaires/>

line A (train station to downtown) : <http://www.tisseo-urbain.fr/734991.pdf>

line B (downtown to university) : <http://www.tisseo-urbain.fr/734994.pdf>

