



Theory @ Institut Néel: Master internships 2020/2021

Presentation by Didier Mayou

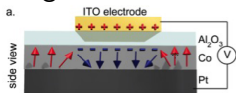
Néel Institute: a big lab!



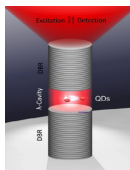
- ▶ 160 permanent researchers (CNRS, UGA, Phelma)
- ▶ 120 permanent technical staff
- ▶ 50 regular visitors
- ▶ 40 Postdocs
- ▶ 110 PhD students
- ▶ 70 Master Interns

Variety of scientific topics in condensed matter

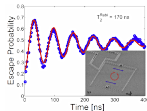
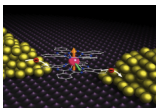
► Magnetism



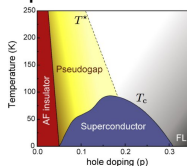
► Optics



► Quantum electronics



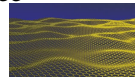
► Superconductivity



► Quantum fluids

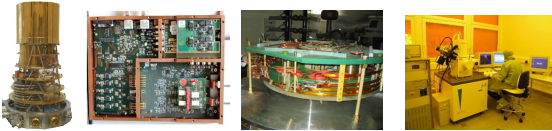


► Material science

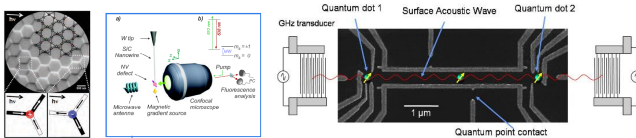


Néel Institute: research organization

- ▶ Research from fundamental to applied science
- ▶ Tradition in cutting-edge instrumentation



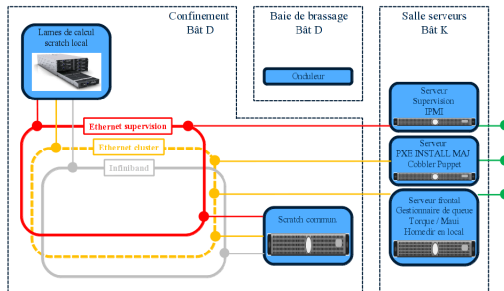
- ▶ Leading expertise in nanoscale and quantum engineering



- ▶ Great environment: CEA, ILL, ESRF, LCMI, LPMMC, UGA...
- ▶ Strong interplay between theory and experiments

Theory @ Néel: overview

- ▶ About 20 researchers + about 20 PhD students/postdocs
- ▶ Organization: 2 theory teams + a few theoreticians in experimental teams
- ▶ Scientific life: weekly experimental and theory seminars (internal or joint with other labs of the polygone)
- ▶ Computing facility: 2 clusters with 256 cores for 5 TeraFlops



Practical information for future Interns

Duration and salary:

- ▶ Minimum of 2 months
- ▶ Salary of 591 euros per month
- ▶ M2 internship may be extended over the summer
- ▶ For Germans: Masterarbeit (one year project) is in principle possible if funding is available

Life @ Néel:

- ▶ Internal student seminar + buffet (twice per month)
- ▶ Check our new twitter account: [@NeelTheory](#)

Important:

- ▶ Don't hesitate to contact individual researchers if you look for a specific internship besides the ones presented here

M2 Internship with Andrés Cano & Valerio Olevano

Contact: andres.cano@cnrs.fr; valerio.olevano@neel.cnrs.fr

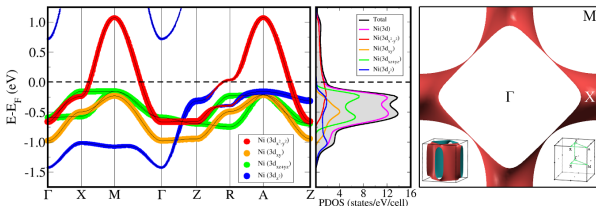
Possibility of PhD: Yes

Topic: Electronic structure and superconductivity

Title: “Novel superconducting materials”

Goal: Identification of novel unconventional superconductors from electronic-band-structure descriptors

Methods: Numerical simulations & Density functional theory



M2 Internship with Didier Mayou

Contact: didier.mayou@neel.cnrs.fr

Possibility of PhD: Yes

Topic: Electrical power systems

Title: “Equivalence between electrical networks and tight binding”

Goal: Study the consequences of lines/nodes failures in smart grids

Methods: Concepts of condensed matter to study smart grids



M2 Internship with Didier Mayou

Contact: didier.mayou@neel.cnrs.fr

Possibility of PhD: Yes

Topic: Photovoltaics

Title: “Modeling of charge transfer at interfaces”

Goal: Develop more realistic model of molecular photocells

Methods: Quantum dynamics of electrons and vibration modes

