SCUOLA NORMALE SUPERIORE

RELAZIONE ATTIVITA' ANNUALE DEI PERFEZIONANDI/DOTTORANDI – TERZO/QUARTO ANNO
REPORT ON THE PHD ACTIVITY – THIRD/FORTH YEAR

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| **NOME E COGNOME<br>NAME AND SURNAME** | Pietro Novelli |
| **DISCIPLINA<br>PHD COURSE** | Nanosciences |

| **CORSI FREQUENTATI SENZA SOSTENIMENTO DI ESAME FINALE<br>ATTENDED COURSES (ATTENDANCE ONLY)** | **NUMERO DI ORE<br>HOURS** |
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| **ALTRE ATTIVITÀ FORMATIVE (SEMINARI, WORKSHOP, SCUOLE ESTIVE, ECC.) – DESCRIZIONE<br>OTHER PHD ORIENTED ACTIVITIES (SEMINARS, WORKSHOPS, SUMMER SCHOOLS, ETC) – DESCRIPTION** | **NUMERO DI ORE<br>HOURS** |
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| Capri Spring School on Transport in Nanostructure 5-12 May 2019 | 27 |
| Internal group seminars 1h each week for most part of the academic year | |
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**ATTIVITÀ DI RICERCA SVOLTA (MAX. 8.000 CARATTERI)*
RESEARCH ACTIVITY (MAX. 8000 CHARACTERS)**

My research activity in this year concerned the study of physical properties of twisted bilayer graphene over numerous different aspects: electronic structure (band structure of different models and approximations: tight binding, with and without atomic relaxation effects, continuum model with and without relaxation effect, continuum model accounting many-body screening effects), linear response (evaluation of the Lindhard function), optical properties, plasmons, transport. During the past year I have also done a 1 month research period in Paris at the LPS laboratory in Orsay under the supervision of M.O. Goerbig, in which I had the possibility to deepen the knowledge on the magnetic properties of Twisted Bilayer graphene. I have also worked closely with the group of F. Koppens at ICFO (Barcelona) to give theoretical support for a

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recent experiment on the collective excitations of twisted bilayer graphene.

*se si intende sottoporre una relazione di ricerca più estesa, utilizzare il campo per una descrizione sintetica e allegare il documento in formato .pdf

If you are going to submit a longer report, please fill the box with a synthetic abstract and attach a document in pdf format

| **EVENTUALI PUBBLICAZIONI**<br>**PUBLICATIONS (IF AVAILABLE)** |
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| Failure of Conductance Quantization in Two-Dimensional Topological Insulators due to Nonmagnetic Impurities - Phys. Rev. Lett. **122**, 016601 (2019) |
| Collective excitations in twisted bilayer graphene close to the magic angle (to be submitted soon) |
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| **NOME DEL RELATORE**<br>**THESIS ADVISOR** |
|---|
| Marco Polini |

| **DATA**<br>**DATE** | 25/09/2019 | **FIRMA**<br>**SIGNATURE** |  |
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