PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 38th cycle

Research Area n. 4 - Telecommunications

PNRR_352 Research Field: MULTILAYER COATINGS FOR ANTIREFLECTION AND MICROMIRROR IN THE MIR AND LIR WAVELENGTHS

<table>
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<tr>
<th>Monthly net income of PhD scholarship (max 36 months)</th>
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<td>€ 1400.0</td>
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In case of a change of the welfare rates during the three-year period, the amount could be modified.

**Context of the research activity**

**Motivation and objectives of the research in this field**

The research covers the scientific and industrial needs to realize multilayer thin films for eliminating or increasing the reflectivity in a broad wavelength range (UV to LWIR) from photonics and electronics devices. The approach follows a complete multiphysics methodology. Numerical evaluations (design) and characterizations of the device.

**Methods and techniques that will be developed and used to carry out the research**

Design and analysis of thin multilayer films for antireflection and mirror application in a wide wavelength range. Deposition techniques with sputtering, evaporators and CVD. Material analysis. Device characterization. Simulation with custom software and commercial software.

**Educational objectives**

The educational objectives cover the entire field of materials and fabrication processes for photonics with a multiphysics approach. Photonics, microwave, electronics, thermal and software are routinely used in the group. The student will work in an international environment.

**Job opportunities**

Job opportunities in technology and material science for photonics are huge worldwide. STm recruits regularly PhD for R&D and production.
All my previous PhD found a job in the field of photonics, 2 in USA, 2 in Canada and 3 in Italy.

### Composition of the research group
- 1 Full Professors
- 1 Associated Professors
- 4 Assistant Professors
- 4 PhD Students

### Name of the research directors
Prof. Andrea Melloni

### Contacts
andrea.melloni@polimi.it

### Additional support - Financial aid per PhD student per year (gross amount)

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<th>Description</th>
<th>Amount</th>
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<tr>
<td>Housing - Foreign Students</td>
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<tr>
<td>Housing - Out-of-town residents (more than 80Km out of Milano)</td>
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### Scholarship Increase for a period abroad

- **Amount monthly**: 700.0 €
- **By number of months**: 6

### National Operational Program for Research and Innovation

- **Company where the candidate will attend the stage (name and brief description)**: STMicroelectronics Electronica, MEMS (https://www.st.com/content/st_com/en.html)
- **By number of months at the company**: 6
- **Institution or company where the candidate will spend the period abroad (name and brief description)**: STMicroelectronics, Grenoble, France Electronics, Photonics, MEMS (https://www.st.com/content/st_com/en.html)
- **By number of months abroad**: 6

### Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

- **Attinenza alla tematiche, alle missioni/componenti prescelte del bando PNRR v. D.M. 352, art.6**

  L'Italia da tempo vanta eccellenze nel settore di produzione di sensori MEMS innovativi con diverse aziende. STMicroelectronics, leader mondiale del settore, ha una consolidata collaborazione con diverse Università Italiane e in particolare con il Politecnico di Milano (come dimostrato dal grande investimento fatto con il JRC MEMS e STEAM). La proposta di questa borsa co-finanziata è perfettamente in linea con la propria politica di rinnovamento produttivo, ed è allineata con la missione tecnica M1 e la Key Enabling Technology Photonics.
L'argomento riguarda sensori ottici a MEMS. Nello specifico, la componente del PNRR alla quale il presente progetto di ricerca risponde è la M1C2, Investimento 2: Innovazioni e tecnologia della microelettronica.

Impresa, presso cui si svolgerà l'attività esterna

STMicroelectronics
Electronica, MEMS
https://www.st.com/content/st_com/en.html
6 mesi
Design e caratterizzazione dispositivi TMOS
Attività in corso nell'ambito del JRC STEAM

Ente, università, azienda, centro di ricerca presso cui si svolgerà il periodo di studio e ricerca all'estero.

STMicroelectronics, Grenoble, France
Electronics, Photonics, MEMS
https://www.st.com/content/st_com/en.html
6 mesi
Silicon Photonics
Collaborazioni spontanee e in ambito di progetti EU su tematiche di silicon photonics

All information regarding educational activities, personal funding, regulations and obligations of Ph.D. candidates are available on the web site https://dottoratoit.deib.polimi.it/