POLITECNICO DI MILANO

PhD in INGEGNERIA DEI MATERIALI / MATERIALS ENGINEERING - 38th cycle

THEMATIC Research Field: INNOVATIVE MATERIALS FOR NUCLEAR FUSION APPLICATIONS

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0 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 approaching end of fossil fuels reserves calls for a massive scientific and technological effort to identify new concept, materials and devices for energy conversion and storage. Nano science and technology are at the fore front of such activity. Focus of the PhD program will be on materials for advanced nuclear technologies. The main objective is to develop innovative nanoceramic based barrier layers capable of simultaneously performing different tasks which are required in nuclear fusion reactors: to avoid corrosion of the structural steels, in particular when exposed to lithium containing working fluids, to avoid tritium permeation and to avoid Magneto-Hydro-Dynamics phenomena.
Methods and techniques that will be developed and used to carry out the research	An important aspect will be the production of innovative nanostructured thin films and surfaces, by physical deposition techniques (e.g. pulsed laser ablation, sputtering). Material characterization by scattering techniques (Raman, Brillouin, X-ray), atomic force microscopy, electrochemical characterization of materials and devices. Part of the activities will be carried out at the premises of the X-nano company.All activities will be carrier out in the framework of the EURATOM funded project INNUMAT.
Educational objectives	Education of people to be “launched” in the world of research and technology in the field of physics and

	engineering of materials, able to manage interdisciplinary issues, perform and interpret complex experiments and produce new equipments
Job opportunities	Private and public R. &D. Highly qualified positions in a wide range of industries related with production, development and use of materials, non necessarily limited to the nuclear field, but also in the energy sector as a whole, as well as electronics and mechanical manufacturing.
Composition of the research group	0 Full Professors 1 Associated Professors 2 Assistant Professors 1 PhD Students
Name of the research directors	Prof. Marco Beghi / Fabio Di Fonzo

Contacts
Telephone: +39 022399-6351 Email: marco.beghi@polimi.it http://www.nanolab.polimi.it Telephone: +39 3383034992 Email: fabio.difonzo@x-nano.it https://X-nano.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Confidentiality: since this is a thematic scholarship, the management of Confidential Information, Results and their publication is subordinate to the restrictions agreed upon with the funding company. Upon acceptance of the scholarship, the beneficiary must sign a specific commitment. **Educational activities** (funding for participation in courses, summer schools, workshops and

conferences) - financial aid per PhD student per year:
1st year: around 1.900 euros per student
2nd year: around 1.900 euros per student
3rd year: around 1.900 euros per student

Teaching assistantship: availability of funding in recognition of supporting teaching activities by the PhD student:There are various forms of financial of for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities within the limits allowed by the regulation.