



PhD in SCIENZE E TECNOLOGIE ENERGETICHE E NUCLEARI / ENERGY AND NUCLEAR SCIENCE AND TECHNOLOGY - 39th cycle

PNRR 117 Research Field: DEVELOPMENT AND CHARACTERIZATION OF ADVANCED COATINGS FOR INNOVATIVE NUCLEAR SYSTEMS

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 design, production, and characterization of novel materials with outstanding performances is a crucial point for the development of next-generation nuclear systems. In this respect, materials must meet different requirements in terms of exhibited properties, according to the specific nuclear areas under investigation. Through an experimental approach the PhD project focuses on the study of materials of interest for lead fast reactors (LFRs) and laser-plasma interaction experiments. In both cases, the considered aspects will be: (i) deposition and characterization of films and coatings tailored at the nanoscale; (ii) integration of the produced films in the nuclear system of interest; (iii) evaluation of the deposited coatings behaviour during the interaction with relevant environments (e.g., laser fields or liquid metals, respectively). The study is supported by newcleo S.r.l. in the framework of the PNRR recovery plan. in line with Mission 2: Green revolution and ecological transition (M2C2) and Mission 4: From research to enterprise (M4C2), this last aiming at the introduction of PhD tracks for innovation in enterprises through the development of high-profile competencies. In this regard an internship with a minimum period of 6 months is foreseen. In addition, the main topic of the presented research program is the development of advanced materials one of the Key Enabling Technologies (KET) identified by the EU



	commission in the framework of the Horizon EUROPE project.
Methods and techniques that will be developed and used to carry out the research	The foreseen research on coatings will be focused on the use of PVD techniques, more specifically Pulsed Laser Deposition and High Power Impulse Magnetron Sputtering. In addition to the deposition techniques different characterization such as SEM, XRD, EDXS will be used. Coatings performances will be evaluated in dedicated experimental facilities in collaboration with national and international partners.
Educational objectives	Education of people to be launched in the world of research and high technology industry in the fields of physics and engineering of materials, able to manage interdisciplinary issues, perform and interpret complex experiments and produce new equipment.
Job opportunities	Private and public R&D. Highly qualified positions in a wide range of industries related with production, development, and use of advanced materials. The present research will be performed in collaboration with national and international partners. In addition to Newcleo Srl we can mention ENEA.
Composition of the research group	3 Full Professors 4 Associated Professors 2 Assistant Professors 11 PhD Students
Name of the research directors	Matteo Passoni

Contacts	
Matteo Passoni Phone 02/2399 3267 Email matteo.passoni@polimi.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

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	newcleo Srl
By number of months at the company	6
Institution or company where the candidate will spend the period abroad (name and brief description)	
By number of months abroad	0

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>Educational activities: Financial aid per PhD student is available for purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences, instrumentations and computer, etc. This amount is equal to 10% of the annual gross amount, for 3 years.</p> <p>Teaching assistantship: Availability of funding in recognition of supporting teaching activities by the PhD student. There are various forms of financial aid 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 regulations.</p> <p>Computer availability: individual use. Desk availability: individual use.</p>