



PhD in INGEGNERIA AEROSPAZIALE / AEROSPACE ENGINEERING - 39th cycle

THEMATIC Research Field: ATMOSPHERIC APPLICATIONS OF PLASMA THRUSTERS

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	<p>Plasma thrusters are widely used in space applications whereas the technology for their operation in standard atmosphere is still in an early stage, giving rise to new lines of research. Atmospheric EHD propulsion potentially allows the development of devices with a thrust per unit power much higher than that of thermochemical propulsion. Despite the knowledge about the underlying physical principle, the problems of maximizing thrust in these devices still require wide-range investigations. On the other hand, this technology purely based on electric energy is expected to lead to important applications, particularly for lighter-than-air aircraft, with possible applications to stratospheric platforms, capable to play the role of satellites while remaining in the high atmosphere.</p>
Methods and techniques that will be developed and used to carry out the research	<p>The research program is based on laboratory activity, externally supported by computational methods. Different experiments on the atmospheric thrusters will be carried out to validate the existing theoretical models and test new promising ideas in the field, including studies with parametric variations of conditions. The best technological solutions will be implemented on a flying demonstrator, which will inherently require a multidisciplinary approach to be designed. The construction of the prototype will be carried out in cooperation with an industrial partner and followed by a complete test phase.</p>
Educational objectives	<p>The main objective is a deep knowledge of the</p>



	engineering of air-breathing plasma thrusters in standard atmosphere. Additional objectives arise with the applications of this topic: design of complex EHD systems, the aerodynamics of plasma thrusters, integration of plasma thrusters in flying prototypes and system control.
Job opportunities	A multidisciplinary approach characterizes this research field and involves a wide range of engineering applications that interest both industry and academia. The job opportunities may include (but are not limited to) profiles of senior fluid dynamicists for complex applications, aerodynamic laboratory specialists, senior test engineers, and designers of laboratory facilities.
Composition of the research group	0 Full Professors 2 Associated Professors 1 Assistant Professors 2 PhD Students
Name of the research directors	Prof. Marco Belan

Contacts	
Dipartimento di Scienze e Tecnologie Aerospaziali - Politecnico di Milano - via La Masa 34, 20156 Milano - Italy - tel. +390223998323 - fax +390223998334 - email: marco.belan@polimi.it - web site: www.aero.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

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
The PhD candidate will receive a desk and a personal computer. Apart from the compulsory ones, the PhD candidate will have the opportunity to follow additional courses, receive economic support to attend summer schools and participate in conferences. There will be the possibility of paid teaching assistantship.