Politecnico di Milano

PhD in
Materials Engineering

Research Title: (New photosensitive reactions and materials for volume holography)

Scholarships and Financial support	
Monthly net income of PhD scholarship (max 36 months)	€. *1300*
Number of scholarships	1
Beginning of PhD	1/2/2017
Deadline for application	*9 gennaio 2017*
Context of the research activity	
Motivations and objectives of the research in this field	The research project aims at studying new photosensitive reactions and materials to be used in the realization of volume Holographic Optical Elements (vHOEs) mainly for astronomical instrumentation. Such elements show a very large efficiency and an easy customization and they find already application as dispersing elements (volume phase holographic gratings). One of the main limitations is the availability of holographic materials with high performances (especially in term of refractive index modulation) and a simple manufacturing process. The goals are i) the design of new molecular systems that undergo photoreaction and a modulation of the refractive index; ii) the developing of thin films suitable for the realization of efficient vHOEs and the possible use in astronomical instrumentation.
Methods and techniques that will be developed and used to carry out the research	The synthesis of the organic molecules will be carried out together with the characterization of the new materials by means of spectroscopy and thermal methods. Different approaches for the manufacturing of thin films will be used and the volume holograms will be produced with suitable set-ups.
Educational objectives	The objectives regard the development of scientific knowledges in the field of photosensitive materials for holography, the capability to carry on a multidisciplinary research project involving different researchers with different expertise.

Job opportunities	The field of volume holography is expanding thanks to new applications from augmented reality devices to Anti-Counterfeiting systems. Unfortunately, there is a limited number of people that developed the skills in this field. This PhD provides such competences focusing mainly on the materials, providing to the student good opportunities for high specialization and future placement.
Composition of the research group	2 Researchers 2 PostDocs 4 PhD students
Names of the research directors	*Andrea Bianco*
E-mail address, phone number and web-page	*andrea.bianco@brera.inaf.it* *+390272320460*
List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research	1. Laboratoire d'Astrophysique de Marseille 2. Instituto de Astrofísica de Canarias
Additional support	
Housing: financial aid per PhD student per year (gross amount)	
Funding for educational activities (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): funding per PhD student per year	*1st year: 0* *2nd year: 1370* *3rd year: 1370*
Teaching assistantship: availability of funding in recognition of support to 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.
Computer availability:	1st year: *individual use* 2nd year: *individual use* 3rd year: *individual use*
Desk availability:	1st year: *individual use* 2nd year: *individual use* 3rd year: *individual use*