Graphene and 2d crystals research @ Istituto Italiano di Tecnologia, Graphene Labs

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Abstract

The Italian Institute of Technology (IIT) is a Foundation established in 2003 jointly by the Italian Ministry of Education, University and Research and the Ministry of Economy and Finance to promote excellence in basic and applied research. The research plan of the institute focuses on Humanoid technologies and Robotics, Neuroscience and Cognition, Nanotechnology and Materials. The Institute has a staff of about 1200 people, the central research lab being located in Genoa. IIT has a large experience with the management of large research projects and has been involved in more than 96 EU funded projects in the last 7 years.

IIT is organized in 9 Departments located in the IIT headquarter in Genoa and 10 Research Centers scattered in the country. The Departments that are actively involved in graphene and 2d crystals research are Nanochemistry (NACH), Nanobiotechnology (NBT) and Nanostructures (NAST). In addition, the IIT research Center Nanotechnology Innovation in Pisa is involved in bottom-up production of graphene by CVD.

Since September 2013 our graphene research is collected under the umbrella of the IIT Graphene Labs (http://graphene.iit.it), which currently involves 17 senior researchers and 8 post-docs working on different aspects of graphene technology. We are currently strengthening our activities through post-doctoral and PhD recruitments in the field of graphene productions, nanocomposites and energy applications. We expect to reach a total staff of more than 30 people by the end of 2014 with further expansion in 2015.

IIT Central Research Lab, a 30,000m^2 facility in Genoa, is equipped with state-of-the-art laboratories for robotics, nanoscience and neuroscience. Relevant to the flagship activities are the colloidal chemistry synthesis for nanoparticle production, the electron microscopy centre, the nanocomposite laboratories, the UHV Low temperature scanning tunnelling microscopy; the optical spectroscopy facility from femtosecond to continues wave (cw), all wavelengths with optical resolution down to 30nm), class 100 clean room for nanofabrication (600m^2) and the recently established graphene production and printing lab.

IIT Graphene Labs is actively involved in realising scientific and technological targets in the field of energy (*e.g.* charge/energy transfer at the graphene-nanocrystal interface for energy conversion, graphene-based Li batteries and supercapacitors), material production (*e.g.* CVD and solution processing) and deposition, and bio-nanotechnology (*e.g.* biocompatibility essays, biomolecule-graphene interaction). We will also have a strong effort in dissemination and technology transfer activities. In particular, the technology transfer program of IIT Graphene Labs is developing through specific agreements with companies. At the moment we have in place agreements with 5 companies on different aspects of graphene exploitation in the energy sector.