Understanding and tuning the mechanical properties of graphene and other two dimensional materials

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In the last decade, significant effort has been invested into the study of the unique electronic properties of graphene and other two-dimensional (2D) materials. Meanwhile the understanding of their striking thermo-mechanical behavior have remained elusive. Membranes and 2D materials exhibit intrinsic out-of-plane thermal fluctuations that have dramatic effects on their conformation and elastic behavior, including a negative thermal expansion coefficient, and the absence of any finite elastic constant in the thermodynamic limit (i.e. stiffness should tend to zero when the size of the membrane tends to infinite) due to the strong anharmonic interaction between out-of-plane bending and in-plane stretching modes.Graphene and other 2D layered materials offer the possibility to explore experimentally these properties and their interplay with defects.

The focus of this Mini-colloquium is the characterization and understanding of the unique mechanical properties of 2D materials and the possibility to tune them. The meeting will cover both experimental and theoretical contributions in this new field, including experimental methodologies to determine the stress/strain state and the associated buckling, the interplay with defects, as well as a theoretical approaches, ranging from phenomenological theories to molecular dynamics (MD) and Monte Carlo (MC) simulations, and even some first-principles calculations. The Colloquium will provide a meeting point for this growing community, with the double goal of presenting the state-of-the-art in the field, and of setting the roadmap for future developments

Invited Speakers (confirmed)

Adrian Bachtold, ICFO, Spain
Kirill Bolotin, Vanderbilt University, USA
Benny Davidovitch, UMass Amherst, USA
Annalisa Fasolino, Radboud University, The Netherlands
Cristina Gomez-Navarro, UAM, Spain
Irina Grigorieva, University of Manchester, UK
Emmanuel N. Koukaras, FORTH/ICE HT, Greece
Rafael Roldan, Institute of Materials Science of Madrid (ICMM), Spain

This colloquium is part of the conference CMD26 - Condensed Matter in Groningen of the Condensed Matter Division of the European Physical Society, which will take place in Groningen, The Netherlands, from September 4th - 9th, 2016. Go to http://cmd26.eu/abstract-submission/ for direct access to the **CMD26** abstract submission page. **Deadline for abstract submission is April 30, 2016**.