

## VII Leopoldo García-Colín Mexican Meeting on Mathematical and Experimental Physics



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### **RENÉ RODRÍGUEZ: Femtosecond laser fabrication of periodic nanostructures on polymeric surfaces reinforced by carbon additives.**

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It has been demonstrated that carbon-based compounds, namely Expanded Graphite (EG), have become excellent fillers to reinforce polymers as Poly (ethylene terephthalate) (PET) to improve their mechanical resistance or electrical conductivity. Additionally, nanostructuring of polymers allows the modification of surface properties. A study about the generation of Laser Induced Periodic Surface Structures (LIPSS) in polymeric surfaces of PET and PET reinforced with expanded graphite is presented. Laser irradiation was carried out with the fundamental and the 3rd harmonic of a linearly polarized Ti:Sapphire laser (FWHM 120 fs for 795 nm and 260 fs for 265 nm; 1kHz) focused on thin films (~100 nm thick) of the aforementioned materials deposited in glass, silicon, and metal substrates and on self-standing films (~400 μm thick). Differences are observed for the films deposited on the different substrates in terms of irradiation parameters, i.e., fluence and number of pulses, needed for the onset of the formation of well-ordered nanostructures. Furthermore, the properties of the surfaces after irradiation were monitored. Atomic Force Microscopy (AFM) was used to analyze the topography and the adhesion force in the micrometer range. Contact angle measurements were carried out to evaluate the wettability of the samples and calculate the surface free energies. Finally, Raman spectroscopy was used to check possible chemical modifications in the materials. This study opens the possibility of extending the applicability of LIPSS to different combinations of deposited layers and substrates with properties on demand.

**Session Classification:** PLENARY TALKS

**Track Classification:** SYMPOSIUM ON LASER ABLATION